CIO

HE MAGAZINE FOR INFORMATION EXECUTIVES

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COVER STORY

Working With A Net

How To Keep Your Balance On The Enterprise Wire

ALSO INSIDE

Competitive Intelligence Builds Smarter Companies

Plaza Home Mortgage Corp.'s John Collins

AN INTERNATIONAL DATA GROUP PUBLICATION

Putting Technology

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Minding your LANs and WANs **38**
Cover photo by Lara Jo Regan/Saba

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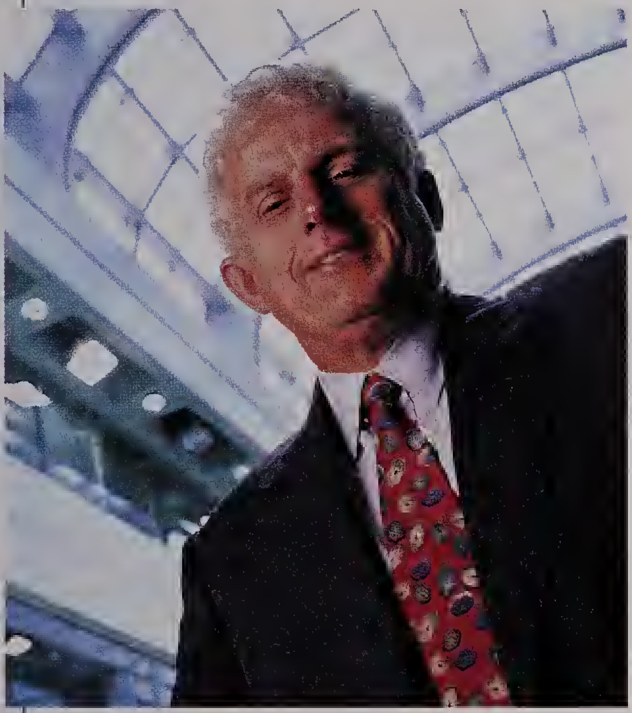
ENTERPRISE NETWORKING **38**

Making Your Net Work

In this age of the ever-expanding corporate network, careful management is more critical than ever.

By Peter Cassidy



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In its own struggle to turn itself around, IBM Canada serves as a beacon for its prodigious parent.

By Richard Pastore

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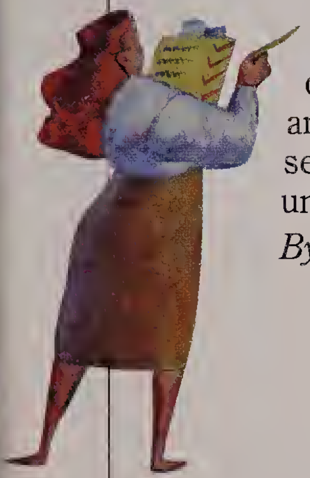
The Quest for Corporate Smarts

To quote Frederick the Great, it is "pardonable to be defeated but never to be surprised." With the goal of averting surprise, more and more businesses are devising programs of organized intelligence gathering and analysis—spurred in no small part by peer pressure, security consciousness and a surfeit of freshly unemployed espionage operatives.

By E.B. Baatz



Get smart
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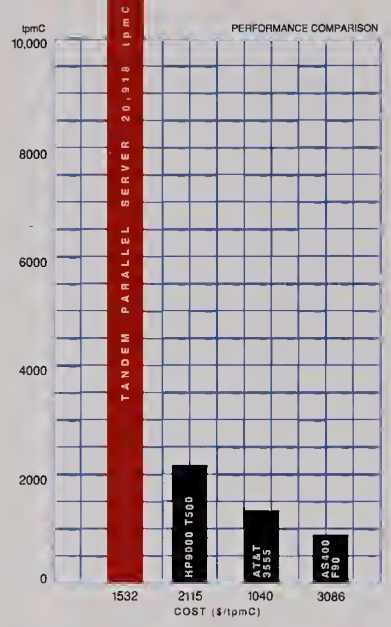

"Tandem Blows Everyone Away."
Datamation, June 1, 1994

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INSIGHTS: CREATION THEORY

Different people have different creative styles when it comes to solving problems. Recognizing the value of each approach is one key to effective teamwork.

By Charles W. Prather

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STATE OF THE ART: SEARCHER SERFS

Intelligent agents, a new breed of search-and-retrieval tool, will help users find the data they want from the sea of data available online.

By John Edwards

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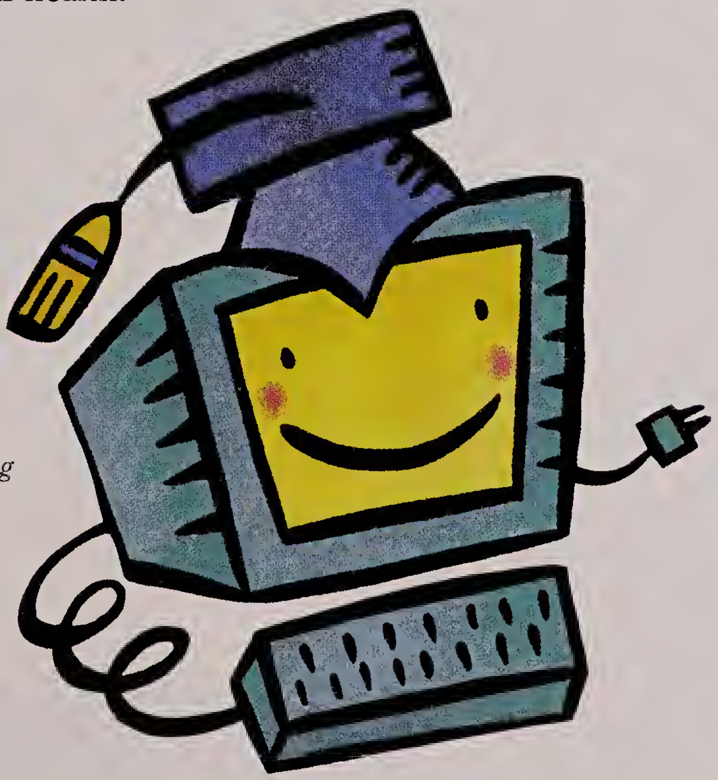
CIO CONFIDENTIAL: A CASE OF RIGOR MORTIS

Intuition says a rigorous technology-procurement process is a good thing, but trying to impose one where it's not wanted can be hazardous to your health.

By W.F. Dyle



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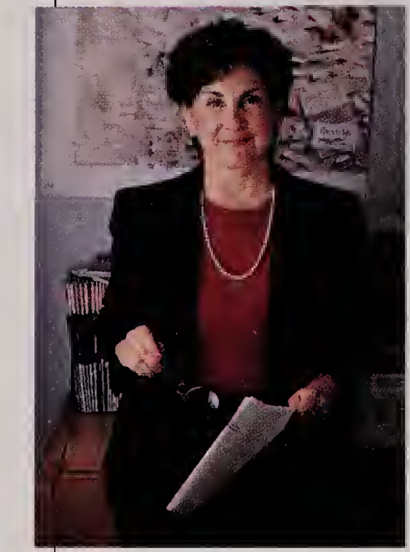
FOCUS ON • EDUCATION

LETTER FROM THE EDITOR



Success in today's competitive environment depends on inventive business solutions. And when it comes to overseeing the information-management process, creativity appears to be a watchword.

Take our northern neighbor IBM Canada. CEO William Etherington has brought a service culture to an organization that once was known for its arrogant attitude. Senior Editor Richard Pastore's article, "Leading by Example," beginning on Page 30, describes the challenges information executives faced in helping to redefine the corporate credo. The subsidiary is now operating with 37 percent fewer IS personnel and a 35 percent reduction in IS budgets. But has service suffered? No way.

Departments hiring services from IBM Canada's IS group have become more prudent customers, knowing that chargebacks are an integral part of the cost structure. To monitor itself more closely and speed application development, the IS group devised an online availability calendar and created a skills database to track the projects on which each developer has worked.

IBM Canada has also internalized the concepts of teamwork and partnering both at the customer level and with other IBM units abroad. For example, developers are working with their counterparts around the globe to create a customer database system.

Inventiveness is also called for on the competitive-intelligence front. As the management of information becomes more critical to the future growth of businesses, information executives recognize they can play a role outside the traditional boundaries of IS systems. Senior Writer E.B. Baatz reports on the growing importance of competitive intelligence to the enterprise and the need to implement systems to support it. (See "The Quest for Corporate Smarts" on Page 48.)

Baatz discovered that today, most information systems are not designed to provide the timely information that managers need to make strategic decisions. But even the most sophisticated intelligence technology is pointless if it doesn't route information to the appropriate people. As one expert contends, intelligence happens in the intersection between technology and methodology.

Just as organizations need to reinvent themselves to cope with the new business reality, information executives need to reexamine the boundaries of information and to explore opportunities for bringing the knowledge base to ever-widening circles within the enterprise.

Marcia Blumenthal

CIO

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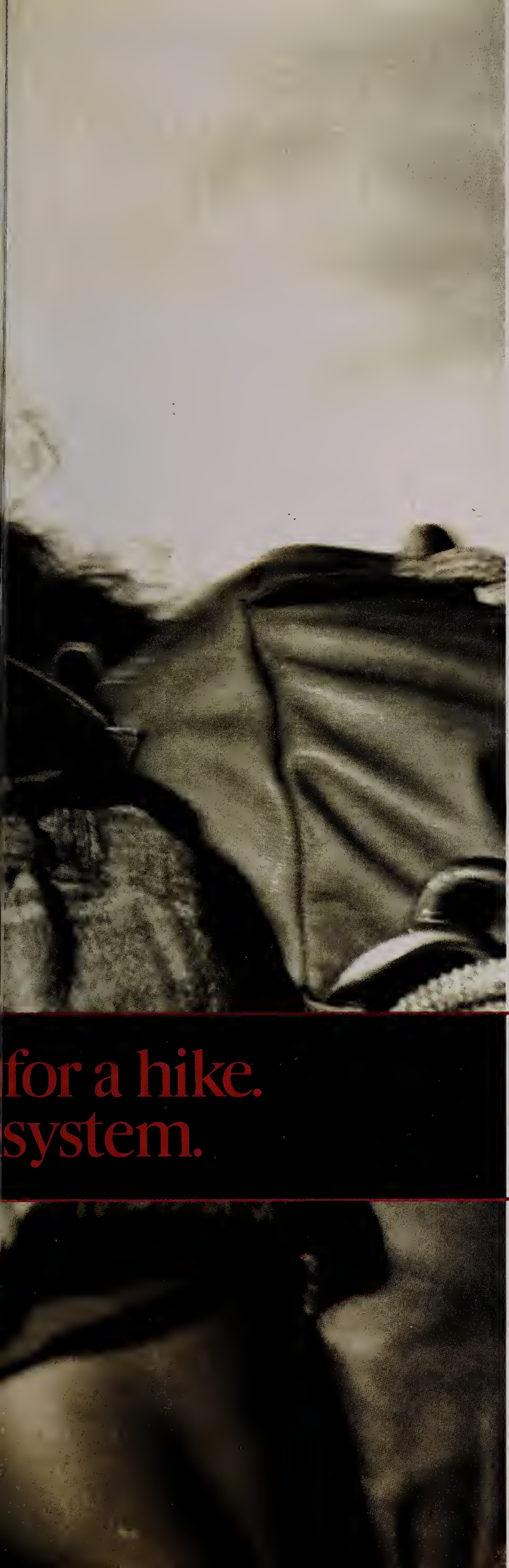

"The phrase 'getting close to the customer' now has a definite high-tech ring," says an article in the *Harvard Business Review.*

"Farsighted companies..." it continues, "have gained a decisive competitive edge by building powerful customer information systems."

The big question is, where are you going to invest the huge chunk of capital it's going to take to build them?

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Jim Bessen, "Riding the Marketing Information Wave" *Harvard Business Review* September-October 1993

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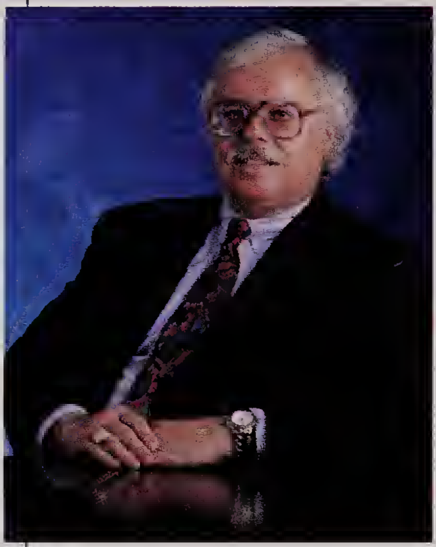

> *"Power now comes from transmitting information to make it productive rather than hoarding it, hiding it and using it like a feudal baron. There is no value in clotted or obscure information—and ultimately, no profit."*
>
> *—Peter F. Drucker*

Next month, CIOs from around the country will converge at the biannual CIO Perspectives conference in Tucson, Ariz., to hear Peter F. Drucker, the venerable dean of business thought, discuss the future of the organization. Drucker's views on the value of IT are inspiring. He contends that organizations must teach their employees to be information-literate, not merely data-literate, in order to compete effectively in the future.

In addition to Drucker's words of wisdom, attendees at the conference will be able to hear numerous other speakers, many of whom will reveal their formulas for creating a value-added IT enterprise. And although they each have their individual opinions, they do agree on one thing: A stronger focus on technology's bottom-line value will play an enormous role in the future successes of companies. Only the right technology solution, delivered effectively—and at a reasonable price—will fit the bill in these fast-paced, cost-conscious times.

Gauging the more qualitative value of IT will also be critical. But that is no simple task—such measures have eluded many an executive. These days, most IT performance measures are financial; in the near future, corporate survival will hinge on the CIO's ability to create metrics that capture this softer value.

I look forward to meeting those of you attending the conference.

P.S. There's still time to register for the October CIO Perspectives conference, "IT Economics: Business Value & Maximization." The conference will take place Oct. 23-26 at the Westin La Paloma in Tucson, Ariz. Please call our toll-free registration hot line at 800 366-0246.

PHOTO BY WEBB CHAPPELL

Coming In CIO

IS in Japan

The concept of a CIO doesn't really exist in corporate Japan. With their consensus-driven society and corporate cultures, Japanese executives say it would be difficult to charge one person with the varied duties of a CIO. But many have begun studying and experimenting with American information-management systems and methods. Just how well they implement new technology and information-management systems will be a significant factor in their international competitiveness.

All in the Family

Franchises are faced with the difficult task of getting hundreds or thousands of individuals to present the same face to the public. Since the desire to be different is built into the human psyche, that's not always easy. *CIO* explores how IT executives manage day-to-day activities in the fiefdom of franchising.

S.O.S.

Although Dan Cheever didn't know much about information systems, he knew that inadequate IS support was hurting his organization, American Student Assistance. After experiencing the most disastrous processing season in its 35-year history, the student-loan guarantor needed someone who could give it straight answers about what was wrong with its systems and how to fix them. The company brought in a consultant, who showed management that it was in fact in a death spiral, and that the only way out was through radical reengineering and reorganization.

CIO PERSPECTIVES

Conference
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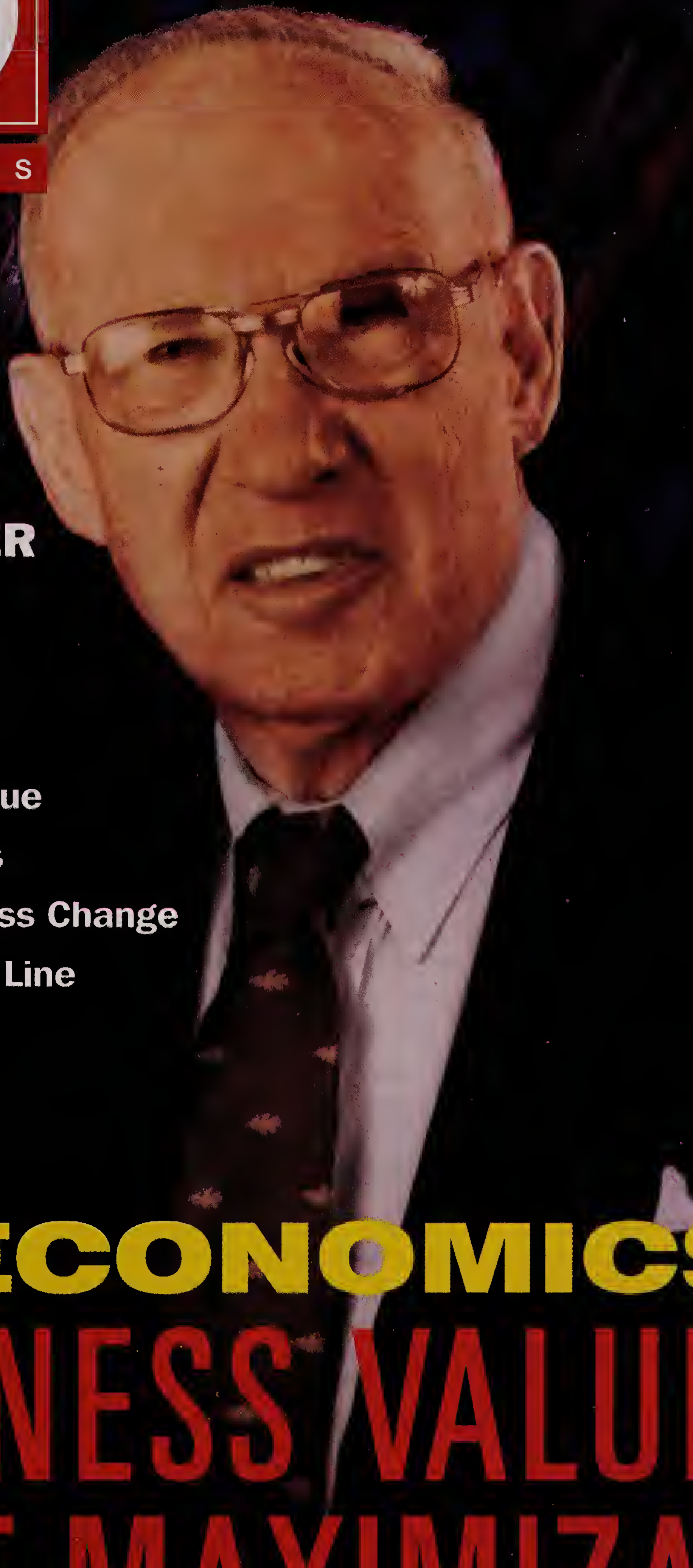

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IT ECONOMICS: BUSINESS VALUE & PROFIT MAXIMIZATION

October 23–26, 1994 ■ Westin La Paloma ■ Tucson, Arizona

CIO
PERSPECTIVES
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INSIDE

Conference Overview
Joseph L. Levy & Lynda Rosenthal

Gunning for Value & Profit
An article on transforming the IT organization to an external focus to demonstrate business value.

Agenda
Annotated information about each general and concurrent session and scheduled activities.

Companion Program
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Conference Overview

If you want to deliver business value and help your organization maximize profits through the focused application of technology — and receive recognition for it — you must attend this program.

In order to demonstrate the value of technology investments, the CIO must show the linkage between IT and improved business performance as well as functional effectiveness. CIOs must also demonstrate how IT enables the enterprise to be greater than the sum of its departments. The focus must move outside the IS organization to an external perspective that includes internal customers, your company's clients and executive suite management. Information is the key to successfully making this transition.

The next CIO Perspectives conference, **IT Economics: Business Value & Profit Maximization,** targets the many different ways technology can impact profit and loss and add value to company strategy. Jim Wetherbe, director, MIS Research Center at the University of Minnesota, and Federal Express Professor of Excellence and director, Center for Cycle Time Research at Tennessee's University of Memphis, will moderate the program and deliver the opening context-setting presentation. And Peter Drucker, the venerable dean of business thought, will discuss the future of the corporation.

Our presenters will reveal their formulas for success and discuss the trails they followed and paths they've blazed. We'll discuss personal preparedness, leveraging diversity and marketing ourselves and our organizations.

Our corporate hosts will display the products and services for which they are recognized. Each host will offer a series of concurrent sessions focusing on applications, such as distributed and workgroup computing, database technology and access, outsourcing, internal and external partnering, videoconferencing, process management and processors, rapid application development, plug compatible mainframes, object-oriented programs, and more.

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Regards,

Joseph L. Levy
Joseph L. Levy
President & Publisher
CIO Communications Inc.

Lynda Rosenthal
Lynda Rosenthal
Senior Vice President & General Manager
Executive Programs

Gunning for Value & Profit

BY TOM KIELY

Go ahead, pull that trigger: Corporate rows about the value of technology have begun to resemble gunplay at the OK Corral. Is that new order entry system worth the investment? Will a costly sales automation project yield a return? Do the hidden costs of end-user computing gobble up productivity gains?

Yes, no, maybe: blam, blam, blam!

With all this gunfire, it is no wonder many of today's CIOs are running for cover. The successful manager in today's corporation understands that information technology can change the rules of competition overnight. And managers also know that only the right technology solution, delivered effectively, and at a governable price, will fit the bill in these fast-paced, cost-conscious times. In addition to being more than the authors of good support systems, CIOs must also sell and deliver real business value to their organizations.

That's a tall order, especially since traditional measures of IT effectiveness, old as museum pieces, are poor yardsticks for business value. Jim Wetherbe, director, MIS Research Center at the University of Minnesota, and Federal Express Professor of Excellence and director, Center for Cycle Time Research at the University of Memphis, notes that long-in-the-tooth IS measures — such as code generation per employee hour — may gauge functional effectiveness, but cannot measure the value of systems or information to the business. "Measures for business value need to be externally focused, not internally [IS] focused," Wetherbe says.

One company grappling with new ways to measure and justify the business value of technology is E.I. DuPont de Nemours & Co. Inc., of Wilmington, Delaware. DuPont's vice president of information systems, Cinda Hallman, explains that the company's IS organization is redefining itself as it redefines IS value. "We are transforming ourselves to think of the business value [of IS] rather than the cost," Hallman says. "We are looking at metrics for how to do this."

Hallman believes her IS organization must become an integral component of business endeavors. That means IS must redirect its focus from itself to the world outside the CIO's realm, partnering with customers to solve business problems. "Right now most of our IS performance measures are financial," Hallman adds. "But what we're looking for are measures for the value-added of IS."

Good, hard, quantitative measures for the business value of IS won't be easy to devise, Hallman acknowledges. For instance, how does one measure the business value of reducing time in cross-functional processes? How can the IS component of time reduction be quantified? How can soft benefits be weighed against hard?

David MacPherson, at Del Monte Foods Inc., in San Francisco, is also wrestling with IT business measures. MacPherson reports that he is trying to define the business value of technology "from senior management's point of view." He is currently developing a suite of measures that will, among other assessments, gauge the role of IT in reengineering efforts. ➢

"They are profit and loss measures," MacPherson says. "If you're sitting on the board of directors, or in the senior executive suite, what is important [about technology assessment] is understanding how technology will impact profit and loss, or add value to the company's strategy."

Attempts such as these to redefine business value are complicated by the sheer speed of business change. As Jim Wetherbe points out, "CIOs are under pressure to make decisions about technology in less and less time. They need to learn about the practices of others [who are successfully or unsuccessfully implementing new technologies in order to achieve economic results]."

Speed is just one variable in the business value equation — information itself is another. Management guru Peter Drucker contends that "information literacy," or the ability to distill meaning from data, will increasingly differentiate corporate winners from losers. The value of information literacy, then, will be as bottom-line as it gets. How is it to be measured?

Drucker, who is the Clarke Professor of Social Science and Management at the Claremont Graduate School, in Claremont, California, contends that companies run by managers without a clear perception of their information needs may be at a competitive disadvantage. (He faults executives for failing to identify the information they and their organizations need to accomplish goals, and for being reluctant to abandon information that is no longer meaningful.)

"If you're sitting on the board of directors, or in the senior executive suite, what is important [about technology assessment] is understanding how technology will impact profit and loss, or add value to the company's strategy."

Drucker asserts that mid-sized corporations, in all developed countries, are consistently growing faster and performing better than big corporations "in marked contrast to twenty years ago." He declares that "diversification no longer works, especially in global markets, where it is hard to get information. There is no data at all in many markets." Smaller, focused businesses are more adept at learning in data-poor or data-fractured markets, although they are also more vulnerable to rapid changes in technologies and markets.

Information literacy will become an increasingly more pressing issue as even the most local of companies become drawn into the global economy, Drucker adds. The productivity of knowledge and service workers, rather than blue collar manual workers, will determine competitiveness in individual companies, industries and nations as the decade progresses. Yet, traditional methods for gauging the return on technology investments are inadequate tools for appraising outlays to further information literacy. True, the business value of IT cannot be sold if it can't be defined and measured, but invalid measures can sway managers to make the wrong decisions.

The people who provide technology and IS services to the enterprise also add value to corporate strategies. After all, productivity begins with people. Hattie Hill-Storks, CEO of the International Productivity Institute, in Dallas, Texas, notes that productivity rises when employees feel valued. Employees want to contribute more sometimes than the management systems that encase them will allow. Team work, empowerment and the redesign of work around processes rather than narrow, functional tasks — all these are strategies for boosting productivity, for creating additional value. (At least one large IS organization has developed metrics to evaluate the effectiveness, and thus the value, of individual teams!)

A strategic focus on employee diversity can also boost productivity, Hill-Storks argues. A mix of employee differences in age, gender or ethnic background, for instance, encourages new points of view to emerge. (The mix might also include employees who are physically or mentally challenged.) A mix of Hispanic, Asian, and African-American experience, brought to bear on a business problem, can spark creative new ideas. Employee diversity can also sensitize managers to the multiplicity of differences to be found among increasingly segmented customer markets.

For diversity to lend value, it must be managed adroitly. When it works, employee productivity contributes to profits. But it is tough to measure people-value, except in the most approximate of ways (such as employees to sales).

Similarly, it is tough to measure IT's contribution to profits, especially on a project-by-project basis. But if executives intend to fully recognize their organization's capabilities in this new, competitive environment, they need to look harder at the economics of IT. If nothing else, better measures will silence the gunfire. ■

Drucker On Information Value

In his recent Wall Street Journal *articles and in interviews with the* Harvard Business Review *and other publications, Drucker has placed heavy emphasis on the value of the "I" in IT. Here is a distillation:*

Companies need to pay more attention to outside information — including data on non-customers and trend information, and to understand economic and technical changes, demographics, and the maneuvers of competing firms. And managers must establish a methodology to incorporate this new data into their decision processes. For instance, commercial banks did not realize, soon enough, that an increasing number of potential customers were borrowing from new commercial paper markets.

■ ■ ■

Reengineering, in essence, means transforming a company from the flow of things to the flow of information. Technology is a tool to aid reengineering, but executives should not confuse information technology with information. Know what you need to know. Do not become distracted with figuring out better, faster, or higher-tech ways of gleaning information.

■ ■ ■

Information specialists cannot turn data into information. Rather, they must spur their customers to ask the questions that will transform business information users from data-literate to information-literate employees.

■ ■ ■

In the information age, teaching, as well as learning, is critical to performance. Knowledge workers learn best by teaching. Overall productivity can rise if a star performer is asked to share success tactics with other employees.

■ ■ ■

Information is everyone's responsibility. It is the primary tool in our emerging post-capitalist world. But, he warns, eschew intellectual arrogance: Power now comes from transmitting information to make it productive, rather than hoarding it, hiding it, and using it like a feudal baron. There is no value in clotted or obscure information. And ultimately, no profit.

CIO
PERSPECTIVES

IT Economics: Business Value & Profit Maximization

October 23–26, 1994
Westin La Paloma
Tucson, Arizona

Sunday, October 23

3:00pm–6:00pm
Conference Registration

7:00pm–9:00pm
Welcome Reception & Registration

9:00pm–12:00am
Hospitality/Networking

Monday, October 24

7:00am–8:00am
Breakfast

8:00am–8:20am
Welcome & Opening Remarks

Joseph L. Levy
President & Publisher
CIO Communications Inc.

8:20am–9:30am
Improving IT Economics: Best Practices Makes Perfect

Conference Moderator
Dr. Jim Wetherbe
Director, MIS Research Center
University of Minnesota

Federal Express Professor of Excellence & Director, Center for Cycle Time Research
University of Memphis

In order to achieve profit maximization and economic results, IT organizations must use the best practices available for strategic planning, information architecture, business reengineering, total quality management, object-oriented development, computer-aided software engineering (CASE), self-directed teams, client/server architecture and more, in order to succeed. Jim Wetherbe will discuss a Best Practices research program that has included systems development research for more than 75 companies.

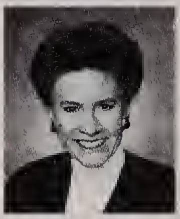
9:30am–10:15am
Gearing Up the Bottom Line through IT

Arnold P. Cohen
Chairman & CEO
London Fog Corporation

Apparel companies are reengineering themselves to become more responsive to the consumer while improving profitability. The apparel industry must renew itself by looking at what it and other companies are doing, and how to share information from consumer preferences through the design, manufacturing, merchandising and distribution processes. IT enables this rapid change.

10:15am–10:45am
Coffee Break

10:45am–11:30am
Delivering Business Value: The Next Generation



Cinda A. Hallman
Vice President
Information Systems
E.I. DuPont de Nemours & Company

IS can no longer function as a service company that concentrates only on cost reduction efforts. It must become an integral component of the business and deliver sustainable integrated solutions to significantly benefit the bottom line. Business value must be specific, measurable and recognized by business leaders. The transformation of the IS capability from an internal to external focus, with emphasis on partnering to deliver value, is critical. Cinda Hallman will describe the process DuPont used to realign the global IS capability to deliver business value.

11:30am–12:15pm
Managing Technology as a Business

Dominick J. Landi
Managing Director
Technology Production Services
J.P. Morgan

To be successful from a financial and value perspective, IS must be managed as a business. Providing first-class service in quality, organizational structure, process automation and the selective "sourcing" of services leads to greater competitive advantage for other businesses within the firm. Dom Landi will address understanding the organization's core competencies and their full deployment, including enterprise automation savings, technical center consolidation and an organizational model for effective management of both mainframe and distributed computing infrastructure environments.

12:15pm–1:30pm
Luncheon

1:30pm–6:30pm
Small Group Discussions, Networking & Recreation

Executive Leadership in the Information Age: Changing the Way Leaders Think about IT
Courtesy of EDS

6:45pm–7:30pm
Reception

7:30pm–9:00pm
Dinner, Entertainment & Tournament Awards Ceremony

9:00pm–12:00am
Hospitality/Networking

Tuesday, October 25

7:00am–8:00am
Breakfast

8:00am–8:45am
Critical Success Factors in Managing Global Process Change

William E. Johnston
Director, Corporate Financial Systems Development
United Technologies Corporation

Phillip LaChapelle
Controller
Otis Elevator Corporation

Successful major process change is dependent on sound technology, a clear mission, enterprisewide buy-in, planning and adequate resources. UTC and Otis faced these challenges in reengineering the worldwide consolidation, reporting and information access processes. This session will discuss the methods used to successfully achieve their goals.

8:45am–9:30am
Technology Leadership: One CEO's Commitment to IT

James Maxmin
Former CEO
Laura Ashley Holdings, PLC

To "informate" its organization, Laura Ashley had to create a learning culture, educate its employees, fundamentally change the role of management, and gain access to global technology quickly and safely. These needs led to a unique strategic alliance with Federal Express. As a result of the new strategic direction the company was returned to profit, achieved record sales, positive cash flow and a significant profit increase.

9:30am–10:15am
Repositioning IT to Demonstrate Business Value

David MacPherson
Vice President & CIO
Del Monte Foods

P&L statements traditionally allocate the cost of information technology to IT, but credit the benefits to other cost centers. Thus IT is perceived as a consumer of capital funds and increasing costs. To change this view, IT must reposition itself to be quantifiable, measurable and strategic. This session explores how the CIO can build internal partnerships, contribute to the organization's strategic outlook and identify tactical ventures, all of which will validate and measure technology's expense.

10:15am–10:45am
Coffee Break

10:45am–11:30am
Concurrent Sessions

11:45am–12:30pm
Concurrent Sessions: Repeated

12:30pm–1:30pm
Luncheon

1:30pm–2:15pm
Concurrent Sessions

2:30pm–3:15pm
Concurrent Sessions: Repeated

3:15pm–3:30pm
Coffee Break

3:30pm–5:30pm
The Future of the Corporation

Peter F. Drucker
Clarke Professor of Social Science & Management
Claremont Graduate School

The very biggest companies are splitting themselves or shedding major parts while middle-sized businesses are consistently growing faster and performing much better than the giants. Diversification is becoming increasingly unprofitable while concentration is increasingly risky, as technologies and markets change rapidly and without warning. Competitiveness is increasingly dependent on the productivity of knowledge and service workers, and even the most local of businesses will increasingly operate in the world economy, be shaped by it and compete in it. What do these trends mean for the structure and strategy of the corporation, the CIO and the information function?

5:30pm–6:30pm
Reception with Peter Drucker

Wednesday, October 26

7:00am–8:00am
Breakfast

8:00am–8:45am
Building the IT Charter through Internal Marketing

L. Paul Ouellette
CEO
Ouellette & Associates Consulting, Inc.

The IS department must create awareness of its value to gain recognition and strategic position within the company. IS professionals must become more confident, committed and consistent in marketing their services, their organizations and themselves. Only by positively and repeatedly impacting their enterprises can IS and its professionals be viewed as trusted, knowledgeable, consummate corporate assets.

8:45am–9:30am
Measuring the Business Value of IT

Dr. Akram Yosri
Information Technologies Institute
New York University

One way to measure ROI on IT expenditures is to demonstrate the impact of the investment on an RCF (revenue contributing factor). This unique method measures IT benefits by linking certain IT investments such as sales growth and market share to RCFs. Akram Yosri will use a Fortune 500 company case study to show how his IT expenditure model can be applied to IT investment decisions.

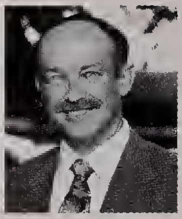
9:30am–10:15am
Leveraging Diversity as a Competitive Business Strategy

Hattie Hill-Storks
CEO
International Productivity Institute (IPI)

Business leaders in a changing workplace must address the growing and permanent diversity of their workforces. Organizations that learn to capitalize on the diverse talent within their environments will be leaders in the global marketplace. Hattie Hill-Storks will show how to value diversity and individual contribution, and how to use these resources to become and remain competitive in the global marketplace of the 21st century.

10:15am–10:30am
Coffee Break

10:30am–12:00pm
Mentally Tough: The Corporate Athlete



Dr. Jack L. Groppel
Executive Vice President
LGE Sports Science Center

The pressure to continually perform at nearly maximum levels mandates a whole new level of personal toughness. From sports scientists we have learned that the winning techniques used by champions can answer the needs of corporate America for a solid no-nonsense technology that is easily internalized and enables the corporate athlete to thrive under stress. The Mentally Tough™ program addresses both the need and the plan for personal development and peak mental, emotional and physical human performance.

12:00pm–12:15pm
Summary

CONCURRENT SESSIONS

Each Corporate Host will provide a concurrent session. Each session will be offered twice, and you will be able to attend a maximum of four sessions.

Using Process Management to Reengineer the Business of IT

John Bantleman
President & CEO
LBMS, Inc.

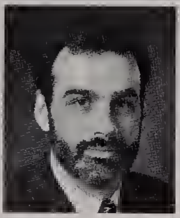
IT organizations are key participants in and often leaders of corporate business process reengineering (BPR) initiatives. Yet many IT organizations are in need of their own internal reengineering. In this session, learn how process management can be used to reengineer the business of IT and increase quality and productivity across all IT activities.

Lessons Learned Migrating to Client/Server ... & Beyond

Mike Bauer
Director, Technology Planning Services
EDS

Business today is looking for new ways to provide additional flexibility to customers, reduce the cost of delivering goods or services, and make timely information available for planning and operations. Implementing and managing distributed networks, setting prices and service levels, dealing with the cultural impact of major technology changes, and selecting the appropriate tools and processes for your environment will be discussed.

The Impact of Technology Innovations on IT Economics



Louis Burns
Director, Marketing
Intel Corporation

Competing in tomorrow's markets means learning to operate in a global economy and finding new ways to meet customer needs. New technology innovations can provide the flexibility to cope with and even exploit the accelerating pace of change. This session highlights how technology innovations will impact your strategies by changing the economics of IT.

Corporate Strategies Update on Workgroup Computing

Gene Cort
Vice President
Information Systems & Support
Lotus Development Corporation

New data object types such as graphics, voice, fax, image and video will be integrated with numbers and text into application processing. Mixed hardware and system environments have become commonplace and are increasingly being connected to networks. Both individuals and workgroups are demanding products that operate across networks, provide ease-of-use features that improve productivity, and facilitate the flow and communication of information.

Forward Deployment of Information for Above the Line Impact

Jeremy Davis
President
Sales Technologies

Courtesy of Nielsen Marketing Research

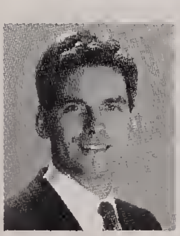
Increasingly, IT is being challenged to deploy technologies to drive the revenue stream. In the consumer packaged-goods industry, initiatives such as ECR (Efficient Consumer Response — "just in time" distribution) are causing IT professionals to deploy technologies and information as revenue drivers.

The Agile Enterprise: The Role of Technology

Mike Galane
Senior Consultant
Hewlett-Packard Company

In this period of tough economics and survivalist thinking, even the best strategies are irrelevant if they cannot be executed quickly. Using examples from Hewlett-Packard and client companies, a methodology to combine the power of the new client/server open system technology with empowered work groups to create the agile organization will be outlined.

Automating the Reengineered Workgroup: The New Priority for IS Management



Frank Gens
Vice President
IS Management Research
International Data Corporation

The rush to reengineer business processes has shifted the focus of many organizations toward integrating and managing technologies that support cross-functional workgroup productivity. Future competitive business systems will include office suites, workflow managers, messaging and document management systems and client/server data access tools. This session will detail the products, processes, technologies and vendors.

Building Profits & Productivity through Videoconferencing

Alan Guibord
Director, MIS
PictureTel Corporation

Videoconferencing provides interactive communication that can dramatically reduce the time-to-market continuum for new products, programs or services among workgroups and experts. It enables companies to involve more people in the decision making process, and simplifies management of international/long-distance enterprises. This session will provide examples of some of the most successful implementations of videoconferencing technology.

When to Outsource: Achieving Corporate Goals through Professional Network Services

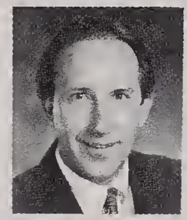
Robert Koontz
Vice President & General Manager
Racal Managed Network Services Division
Racal-Datacom, Inc.

Today, rapidly growing organizations planning local or remote network expansion are faced with a tough decision: commit internal resources or outsource. Computing resources are strategic, and maintaining internal control means relying on a growing network and on the skills of the personnel who run it. Determining which method best achieves corporate goals is complex.

Enhancing & Renewing Legacy Systems to Meet Today's Business Requirements

Amdahl Corporation

Choosing & Managing Business Systems in a Client/Server Environment



Paul Lawryk
Market Development Manager
Sun Microsystems, Inc.

Studies indicate that firms move to client/server architecture to save money or to increase business effectiveness. As software vendors port their mission critical software to client/server architecture, many IT managers will need to implement mission critical applications without all the answers they need. This session provides a summary of 200 commercial customers and addresses business value challenges.

The Results Are In: Client/ Server Solutions That Work

Dave Morehead
Director, Research
IMRS

IT can maximize the competitiveness of the entire enterprise! Client/server architecture, Microsoft Windows, SQL databases, OLE and other options are being used by some of the world's biggest and best-known companies to successfully leverage their resources to move to new technology standards while continuing to focus on business objectives.

The CEO/CIO Disconnect

Alan Paller
Head, Unix Strategies
Computer Associates International, Inc.

The disconnect between CEOs and CIOs has been widely experienced but rarely examined publicly. CEOs often blame the lack of dialogue on the CIO's use of technically complex language and his or her penchant for promising more than he or she can deliver and for underestimating the challenges of IT implementations. This session summarizes a discussion of Fortune 1000 CEOs on what must be done to facilitate "partnering" with their CIOs.

Re-inventing the IS Development & Delivery Process

John Parkinson
Partner
Ernst & Young

Major investments in new tools and processes have made only marginal and unsustainable differences in customer demand for more functionality, usability and integration. Buried in masses of performance data are a few fascinating "truths" for sustained cycle time compression for the IS development and delivery process. The results of observation and research into process accelerators for IS development and delivery will be revealed.

Downsizing: Planning for Success

Jim Ryan
Vice President
Information Management Group
Data General Corporation

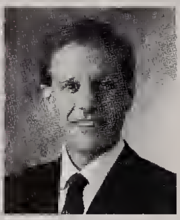
Data General has transformed itself from a manufacturer of proprietary minicomputers to an open systems company. The Information Management Group's mission is being achieved through consolidation, standardization, deployment of new applications and process improvement. In this session you will learn how the company has reduced its worldwide MIS expense by $39 million over the last six years.

Business Objects: A Client/Server Strategy

Keith Short
Director, Advanced Development
Texas Instruments

Businesses facing pressure to improve their performance are finding that client/server technology is well-suited to building applications that support reengineered business processes. But a new development approach is required, bringing together the needs of empowered desktop users with enterprise data and business rules. This session will describe a new approach to building an open, scalable repository.

How Can Today's Database Technology Meet Tomorrow's Scalability Demands?



Steve Sommer
Vice President Marketing
Informix Software, Inc.

Corporations are demanding and generating more data, creating a performance crisis in open systems information management technologies. The challenge is how to manage, administer and analyze the vast amounts of data being collected. We must consider the recent developments and emerging requirements for database technologies, including the latest trends in hardware and application development.

The CIO as the Champion of Change: Who Knows Your Customers?

Paul Williams
Corporate Vice President
Acxiom Corporation

The question is no longer who within your company owns your customer, but who knows your customer? CIOs are uniquely positioned to champion the integration of mission-critical data with external data sources to deliver an information infrastructure. The session will cover strategies for building knowledge-based decisions support applications that allow the IT organization to increase its strategic "value added" and positively impact the bottom line.

Rules for Successfully Deploying Client/Server Applications for the Enterprise

Gupta Corporation

Client/server software will play a key role in rapidly improving the responsiveness of organizations. However, implementing successful client/server applications can be a more formidable task than planning for them. A Gupta representative will offer a clear set of rules to follow to ensure that projects are "enterprise savvy," readily accepted by users and meeting the productivity gains expected of them.

Seamless Integration of Printers in Heterogeneous, Multi-Protocol Environments: What are the Issues?

Anthony D. Deakins
Managing Director
Abraham, McDonald and Associates, Inc.

Courtesy of QMS, Inc.

The value of integrating print systems into heterogeneous, multi-protocol environments poses a significant challenge. This presentation offers insight into the issues that must be considered by today's information executives when introducing printing resources into complex networking environments. Obstacles, benefits and solutions for seamless integration will be examined.

COMPANION PROGRAM

Sunday, October 23

7:00pm–9:00pm
Networking Reception

Monday, October 24

9:00am–10:00am
Companion Breakfast

12:15pm–1:30pm
Luncheon with Conference Participants

1:30pm–5:30pm
Colossal Cave Tour
(Optional)

6:45pm–7:30pm
Reception

7:30pm
Dinner, Entertainment & Tournament Awards Ceremony

Tuesday, October 25

7:00am-8:00am
Breakfast with Conference Participants

12:30pm–1:30pm
Luncheon with Conference Participants

5:30pm–6:30pm
Reception with Peter Drucker

Wednesday, October 26

7:00am-8:00am
Breakfast with Conference Participants

Enrollment in the companion meal program is necessary to attend meals, receptions and entertainment. Enrollment in this program does not include conference session attendance. An optional tour of the Colossal Cave is available for companions. A companion breakfast is scheduled for Monday morning to give everyone a chance to meet. A CIO companion guide will greet companions, review the planned activities and answer any questions.

Tucson's Westin La Paloma Resort

Surrounded by Sonoran desert gardens and natural rock formations twenty-nine hundred feet above sea level, the Westin La Paloma is one of the premier resorts in America. Nestled against the Santa Catalina mountains, the resort has twelve tennis courts — perfect for the tennis clinic and round-robin with Vitas Gerulaitis (courtesy of Computer Associates) — indoor racquetball, Nautilus equipment and a personal services center. Jack Nicklaus designed the golf course, which has been named one of the "Top 75 Resort Courses" in the country.

Corporate Hosts

ACXIOM

Acxiom Corporation, established in 1969, is a pioneer in consumer-based information integration services for Fortune 500 companies and other firms with very large database requirements. Mission-critical data from multiple internal systems is integrated with external data at the customer and household level to provide powerful knowledge-based decision support applications — which drive critical business decisions and give a competitive advantage. Headquartered in Conway, Arkansas, Acxiom has offices throughout the US and UK.

amdahl

Amdahl Corporation was founded in 1970 and has built an enviable reputation for providing high-quality data processing systems and services used in both IBM-compatible and open computing environments. Today, Amdahl is a major supplier of large-scale mainframe computers, data storage subsystems, UNIX system servers and software, applications development and production software and a broad array of educational, consulting and systems support services.

COMPUTER™ ASSOCIATES
Software superior by design.

Computer Associates International, Inc. is the leading independent software company in the world. CA develops, markets and supports integrated systems management, information and business applications software for a broad range of mainframe, midrange and desktop computers. CA serves the international marketplace through direct operations in 29 countries.

Data General

Data General Corporation is an open systems company specializing in servers, storage products and services for information systems users worldwide. Since the introduction of AViiON servers in 1989, open systems sales have grown to 86% of our product revenues. AViiON servers, the DG/UX operating system, and CLARiiON storage form a robust foundation for delivering common sense solutions to large enterprises. AViiON is one of the leaders in the UNIX market and in customer satisfaction.

EDS

For 30 years, **EDS** has helped customers achieve measurable results through information technology — from improving quality to gaining market share. EDS has 70,000 employees worldwide serving more than 8,000 customers. In 1993, EDS posted revenues of $8.5 billion, which is consistent with a historically strong financial performance. EDS provides a full range of services that include: consulting, systems development, systems integration, systems management and process management

ERNST & YOUNG

Ernst & Young is the largest integrated professional services firm in the US and among the largest in the world. Our management consulting practice is a leader in business process reengineering, performance improvement and information technology. The Boston-based Ernst & Young Center for Business Innovation℠ is leading the industry in new ways to empower business through people, process, systems and technology. And our Las Colinas Center for Information Technology Planning and Delivery is dedicated to continuing development of world-class methodologies.

GUPTA

Gupta Corporation created the PC client/server systems software market by delivering the first suite of SQL database products and GUI application development tools exclusively for networked PCs. Smooth integration of Gupta applications and databases into the enterprise is provided via a comprehensive array of connectivity products. Gupta has consistently worked to satisfy the critical requirements of corporate data processing with the flexible, responsive technologies associated with PC networks. Gupta's market-leading PC client/server products will propel anticipated 1993 revenues to $57 million.

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hp HEWLETT® PACKARD

Hewlett-Packard Company is an international manufacturer of measurement and computation products and systems recognized for excellence in quality and support. HP is the second-largest computer company in the United States, with computer revenues in excess of $15.6 billion in its 1993 fiscal year. The company's products and services are used in industry, business, engineering, science, medicine and education in approximately 110 countries. HP has 96,200 employees and had revenue of $20.3 billion in its 1993 fiscal year.

IDC/TIS

IDC/Technology Investment Strategies (IDC/TIS) provides advisory and research services to meet the needs of IT professionals. IDC/TIS subscription services offer farsighted practical advice based on proprietary research focusing on strategic, tactical and implementation IT issues for the business enterprise. IDC has over 250 analysts with expertise in current and emerging information technologies, a worldwide client base of over 3,700 corporations and an annual publication list of more than 2,000 IT-related written research reports.

IMRS®
FINANCIAL INTELLIGENCE®

IMRS develops software for enterprise-level financial management applications in a client/server environment. Founded in 1981, the company's integrated approach to financial management provides access to summarized, enterprise-wide views and underlying supporting detail. IMRS focuses on end user needs while working in partnership with IS professionals to address the diverse transaction processing, accounting, and financial information needs of large corporations. With availability of worldwide support and services, IMRS provides a complete international solution set.

Corporate Hosts

INFORMIX

Informix Software, Inc. is the leading supplier of high performance, parallel processing database technology for open systems. Informix's database servers are the number one choice of hardware manufacturers for publishing Transaction Processing Council benchmarks for UNIX-based systems. Informix products also include development tools for creating client/server production applications, decision support systems, and ad-hoc query interfaces, and connectivity software that allows information to be shared transparently from PCs to mainframes within the corporate computing environment.

intel®

Intel Corporation, the world's largest chip maker, is also a leading manufacturer of networking and communications products. Intel's mission is to supply the electronic building blocks for the new computer and communications industry — an industry in which many key products are built around technologies that Intel has helped pioneer, including the invention of the microprocessor in 1971. Today, approximately 80 percent of all computers, from subnotebooks to supercomputers, run on Intel microprocessors. Increasingly, those systems are used in client/server solutions, workgroup to enterprise and continue to run current and future O/S and application software.

LBMS

LBMS, Inc. is a leading provider of process management tools for Fortune 1000 organizations. The company's products leverage benefits of workgroup computing and open partnerships to address the complex demands of application development in organizations with heterogeneous computing environments. LBMS' products can be used individually, as components in a mixed-vendor client/ server environment, or together in a seamless application development toolset. LBMS tools operate in an open LAN server-based repository system ensuring consistency, integrity and completeness in the application development process.

Lotus®

Lotus Development Corporation (NASDAQ:LOTS), founded in 1982, offers high quality software products and support services that reflect the company's unique understanding of the new ways in which individuals and businesses must work together to achieve success. Lotus' innovative approach is evident in a new class of applications that allows information to be accessed and communicated in ways never before possible, both within and beyond organizational boundaries. The company now markets its products in more than 80 countries worldwide and provides numerous support services.

Nielsen

Nielsen Marketing Research is the global leader in providing marketing and decision support solutions. As a strategic partner with the world's top consumer packaged-goods companies, Nielsen has been the primary supplier of information-based systems and analysis for nearly 70 years. Nielsen built the decision support business overseas and today operates in more than 33 countries worldwide. Nielsen Marketing Research is a company of The Dun & Bradstreet Corporation (DNB).

PictureTel

PictureTel Corporation, the world leader in videoconferencing technology, is "redefining the way the world meets." The company develops, manufactures and markets a full range of visual communications solutions from the desktop to the auditorium, supported by offices in over 100 cities in 50 countries. To provide products and solutions that are in step with the strategic technologies of the '90s, PictureTel is working with the leaders in computing, telecommunications, software and the most respected organizations in a variety of vertical markets.

QMS

A leader in the desktop and networked print systems market, **QMS, Inc.** is committed to exceeding our customers' expectations by providing the best products, best support and best service available. Our high quality products, professional service, advanced technology and "lifetime customer" philosophy have helped QMS establish a solid worldwide customer base. Our award-winning product line includes thermal transfer and high resolution color laser printers, as well as monochrome laser systems for environments ranging from the desktop to networked production printing.

Racal-Datacom™

Racal-Datacom, Inc. is an independent provider of data communications products, systems and services designed to meet the business objectives of corporations and government organizations. The company offers solutions for the implementation, integration, management and support of enterprise networks from the desktop through local area and wide area networks. Racal-Datacom offers a broad range of LAN/WAN products, all managed by a single network management system and all supported by a full range of network services.

Sun

Sun Microsystems, Inc., founded in 1982, is a Fortune 120 company and a pioneer in the general-purpose workstation market, having launched the now popular concept of open systems. Sun's client-server computing solutions include networked UNIX workstations and multiprocessing servers. According to analysts, the company's products command the largest share of one of the computer industry's fastest growing market segments: workstations and servers (42.3%, 1993*). Sun is the exclusive computer supplier to the 1994 World Cup. **Source: IDC March 1994*

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Texas Instruments offers a broad range of business and information technology products and services that allows companies to quickly respond to market demand, provide excellent customer service, and ensure the delivery of quality goods and services. TI's IEF™ for client/server is the first model-driven development environment for client/server application styles on multiple platforms. The world's largest companies generate applications with the IEF to add competitive advantage and enable change within their information systems.

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Sunday, October 23–Wednesday, October 26, 1994
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TRENDLINES

REENGINEERING

DANGER SIGNS

There's little doubt that reengineering can help revitalize a company and improve its competitiveness, but all too often the reality falls far short of the vision. The problem is due, in part, to many companies' difficulty in gauging an effort's chances for success, says Terence T. Burton, founder and president of The Center for Excellence in Operations Inc. (CEO), a management-consulting firm based in Nashua, N.H., that specializes in reengineering and operations improvement.

In the interests of early warning and timely intervention, Burton sets forth 10 telltale signs that a reengineering effort is in trouble:

- Top management has delegated reengineering to a staff organization such as IS, quality, finance or a corporate productivity group. The commitment to change is external and detached.
- The reengineering project has a $12 million price tag but lacks a clear vision, implementation methodology, success criteria, benefits and real-time progress measurement.
- The depth, breadth and focus of reengineering is localized (for example, fix order entry, automate distribution, improve manufacturing, streamline purchasing, etc.).
- There is a profound emphasis and overreliance on IT, automation and networking as the enablers of success.
- The IS group is independently leading the reengineering project, without full empowerment to change the company.
- Reengineering is the new name for rearranging or recycling. It looks and feels like downsizing, TQM, JIT, CIM, EDI, a new list of IS projects or some other tactical improvement program of the past. Reinvention and radical change lie outside the scope of the project.
- The reengineering process is more "out-of-the-book" than "out-of-the-box" and lacks the qualities of chaos, boundaryless change and entrepreneurial thinking.
- A formal communication, awareness and feedback program is lacking; everyone is wondering when the next series of layoffs will be announced, and fear of change

FACING THE MUSIC

The information superhighway may offer a wealth of information, but that won't do much to soothe the savage user. For those who want a little melody from their modems, Geffen Records and CompuServe can help.

This summer, Geffen offered to members of CompuServe a never-before-released song from the popular rock group Aerosmith. Even better, it was free: Geffen waived all royalty charges, and CompuServe did not charge connect-time fees. More than 7,000 people successfully downloaded Aerosmith's "Head First" in the eight days the song was available, according to representatives at the two firms.

CompuServe members typed "go Aerosmith" to download the digitized song, which is just over three minutes long. The actual transfer, however, took considerably longer: The 4.3MB file took 60 to 90 minutes to download, depending on whether the modem speed was 14.4Kbps or 9,600bps.

While offering a full-length song was new, Geffen has provided 30-second electronic sound samples through CompuServe since October 1993. Members can also receive information about the label's artists and new releases electronically, including logos and photographs, and can participate in online interviews.

For more information, contact CompuServe at 800 524-3388.

PHOTO COMPLIMENTS OF GEFFEN RECORDS; ILLUSTRATION BY HAL MAYFORTH

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TRENDLINES

overpowers change itself.

- The reengineering initiative lacks tailored reengineering education and skills development; although everyone is reengineering, they cannot define reengineering.
- Reengineering is being led by the spare resources pool. The individuals who created the current conditions are being asked to think "out-of-the-box" under a shower of political infighting.

For more information, Burton can be reached at 603 883-3677.

WANT NOT, WASTE NOT

Outdated equipment. Excess raw materials. Last season's unsold inventory. Instead of keeping them on the books—or writing them off as losses—businesses may now be able to find a willing buyer through the Global Recycling Network's virtual yard sale of international trade leads.

Founded in 1993 by a group of recycling experts, computer communications specialists and businesspeople from Finland, Italy, Norway, Sweden and the United States, the Global Recycling Network (GRN) is an Internet-linked database that puts sellers of recyclable goods and resources in touch with would-be buyers on the secondary market. Beta-test postings ranged from equipment for sale in Budapest that dissolves molybdenum mandrel wire from tungsten coil filaments to a Russian request for close-out lots of cotton dresses.

For $30 a month, subscribers can post unlimited "sell" or "buy" requests and browse for leads through the GRN database using keyword searches. GRN charges no connect-time fee, nor does it collect commissions for completed sales; buyers and sellers negotiate with each other directly.

"We do the client's walking through the Yellow Pages of the world, but the client follows up and makes the sales call and completes the deal," says GRN President Esko Kilpi of Finland.

The service is slated to be available this month. Send E-mail requests for subscription information to info@grn.com or call 516 286-5580.

STRAINS, TRAINS AND COMPUTER CONTROL

If you've ever traveled by train or plane, you're no doubt familiar with the dreaded domino effect of delays—all it takes is one to mess up everyone's schedule.

At New York's Penn Station, where 1,000 trains each day jockey for position on 21 tracks, travelers are no strangers to this phenomenon. And when delays occur, Amtrak and the Long Island Railroad (LIR)—the two companies that use the station—often resort to finger pointing, according to an article in *The New York Times*. Add to the mix an antiquated mechanical control system with some parts dating back to 1910, and you have all the ingredients of a logistical nightmare.

But improvements are on-track. A computerized control center, expected to be operational by 1996, should alleviate delays and ease tension between the firms. The $110 million facility in Manhattan will feature a wall of computer screens that lets operators centrally control the tracks running between Morrisville, Pa., and New Rochelle, N.Y.

Currently, each of the five towers that jointly control the area can speed trains along without worrying about what results down the line. In the new center, that and some other error-prone human tasks, such as selecting the best route between two locations, will be handled by software.

Amtrak and the LIR will take turns operating the center for six-month stretches. With such cooperation, they just might get the trains to run on time.

ILLUSTRATION BY HAL MAYFORTH

TOOLS RUSH IN

More and more corporations are turning to client/server, but they're not all using the same tools for development.

According to a recent study of 602 corporate sites by Strategic Focus, a Milpitas, Calif., consultancy, 29.4 percent of those surveyed listed Microsoft Corp.'s Visual Basic as one of the top three high-level programming tools they use. Borland International Inc.'s Object Vision was cited by 12 percent of the sites, Powersoft Corp.'s Power Builder was chosen by 10 percent, and Gupta Corp.'s SQL Windows was named by

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NOVELL

The Past, Present, and Future of Network Computing.

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Why settle for one good year?

Six glasses, a toast or two and even the most excellent year is history. Whether it came in a bottle or on a balance sheet.

Unless, that is, you have put into place an approach that can keep delivering vintage year after vintage year. An approach that yields rooted long-term capabilities, not just fleeting short-term results.

At Andersen Consulting, our goal is to give your enterprise the capacity to keep adapting and improving indefinitely. To

accomplish this, we can help you create an optimal blending of all your organization's vital resources: strategy, technology, business processes and people.

Because when all of these components work together, you can be sipping success in the present, while your future is ripening on the vine.

ANDERSEN CONSULTING
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8.9 percent. Nearly half the respondents, meanwhile, indicated that they do not use such tools.

Jay Prakash, principal consultant at Strategic Focus, predicts a shakeout in the market for client/server tools during the next two to three years.

Micro Decisionware Inc.'s Database Gateway was the most frequently cited product in the gateway category (preferred by 15.8 percent of the sites), followed by Gupta's SQL Network (6.9 percent), Digital Equipment Corp.'s Access Works (5 percent) and Information Builders Inc.'s EDA/SQL (3.6 percent).

In a separate study, Strategic Focus evaluated the worldwide market for client/server software tools. The company estimates that the market will grow at the rate of 31.4 percent annually over the next few years, reaching $24.5 billion in 1998. The United States accounts for the largest proportion of this market, with 61 percent; Europe represents 26 percent, while Japan and the rest of the world account for 12.9 percent.

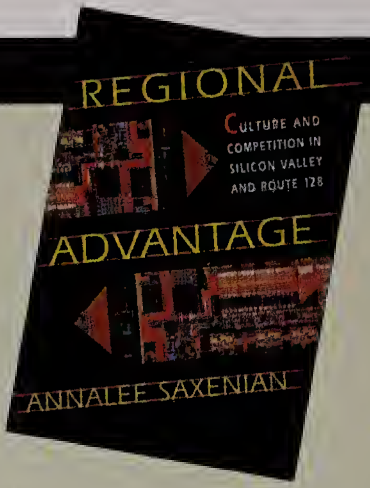
For information, Strategic Focus can be reached at 408 942-1500.

OFF THE SHELF

REGIONAL ADVANTAGE

CULTURE AND COMPETITION IN SILICON VALLEY AND ROUTE 128

By AnnaLee Saxenian
Harvard University Press (Cambridge, Mass.), 1994
226 pages, $24.95



Making sense of one's successes and failures is never an easy task. That's what makes AnnaLee Saxenian's comprehensive review of the shifting fortunes of America's two most prominent high-tech regions—Massachusetts' Route 128 and California's Silicon Valley—such compelling reading. Without getting bogged down in the vagaries of regional economics, Saxenian, an assistant professor at the University of California at Berkeley, provides intriguing insights into why Massachusetts now stumbles and Northern California shines.

Saxenian recounts the evolution of the nascent electronics industry and shares oft-told but still instructive anecdotes about the early movers and shakers.

In the '50s, Massachusetts was driving in the fast lane with its long industrial tradition, excellent university system and ready infrastructure of investment banks, suppliers and distributors. By 1959, more than three times as many people were employed by high-technology businesses in Massachusetts as in Silicon Valley, and Route 128 had earned the nickname America's Technology Highway. Led by Ken Olsen's Digital Equipment Corp., the minicomputer industry flourished in the state's refurbished factories.

Ironically, Silicon Valley got its start because the inventor of the transistor, William Shockley, moved to Palo Alto after being spurned by Massachusetts-based Raytheon. Saxenian attributes Northern California's ultimate success to two main factors: geography and culture.

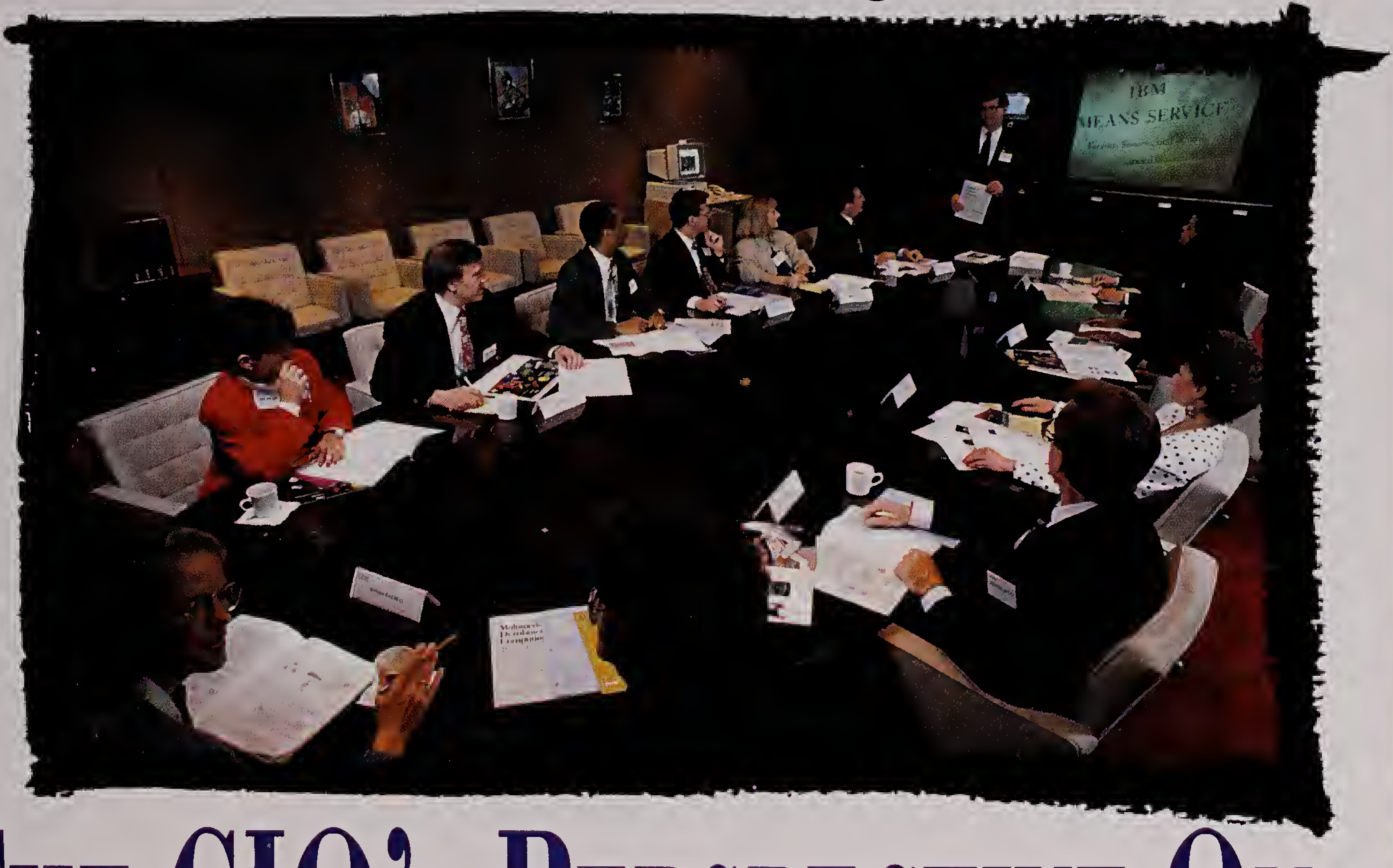
Hemmed in by the ocean on one side and mountains on the other, Silicon Valley had no choice but to locate companies very close to one another, which fostered communication among the firms as well as constant job hopping. Unhampered by long-standing traditions of hierarchical business organization and strict puritan ethics, Valley executives were free to experiment with business models that never would have taken root in the East.

A culture of risk taking where failure was commonplace—even revered—made Silicon Valley a network-based industrial economy, organized to adapt continuously to fast-changing markets and new technologies. Despite a major misstep in the mid-1980s when the region lost the memory-chip battle to Japan, by 1990 the Valley boasted 267,531 high-tech employees, nearly twice the number employed along Route 128.

While culture did much to boost California's fortunes, it was the principal culprit in the failures back East. That role is usually assigned to the decline of the mini and the rise of the PC, but Saxenian blames the region's inflexible business and social structures for its inability to keep up with technological and market volatility. A culture that valued speedy decision making and risk taking became increasingly critical during an era when 6,000 different types of transistors were introduced in just six years.

Saxenian's exploration of regional cultures and her understanding of the forces reshaping business today—such as globalization, decentralization and speed to market—should be of great value to information executives. Yet while *Regional Advantage* is more than just a history lesson, its subject may be on the way to becoming a historical artifact. After all, today anybody can start a business anywhere thanks to the information highway. In an age of virtual and online companies, will regional advantages continue to matter?

IBM Multimedia Executive Briefing Center



THE CIO's PERSPECTIVE ON MULTIMEDIA

Multimedia has breathtaking potential to reenergize communications in business and government. Multimedia can transform the fundamental communications of *your* organization — through more individualized employee training, more exciting merchandising, more productive mobile sales, more extensive government communication with constituents, and more.

With all this potential, it's clear that multimedia can help organizations cut costs, communicate better and achieve a vital competitive edge. For many technology executives, the question now becomes, "How can I integrate multimedia into my organization today?"

Simply by visiting the IBM Multimedia Executive Briefing Center, you can explore multimedia with IBM experts in a hands-on seminar tailored to your business. These experts will demonstrate multimedia applications, and will also show you how multimedia has helped organizations similar to yours.

The Center is part of IBM's Multimedia Consulting and Creative Services group. This organization has the business acumen to understand how multimedia can truly help *your* organization, and the technology vision to ensure that your multimedia ventures rest on a sound and stable foundation.

The following section explores one customer's experience with the IBM Multimedia Executive Briefing Center and what the Center may be able to do for you today.

An Interview with Richard Heitman, Senior Vice President, First Bank System

TALKING TO THE TOP

First Bank System is a major bank based in Minneapolis, Minnesota, with $26 billion in assets. In March 1994, Richard Heitman, senior vice president, led a team of senior First Bank technology professionals to a one-day session at IBM's Multimedia Executive Briefing Center in Atlanta. According to Heitman, the day served as "an excellent visioning device."

Q: Why did you visit IBM's Multimedia Executive Briefing Center?

HEITMAN: It was at the suggestion of our IBM relationship manager, Mike Powers, who responded to my request for IBM to tell us where this "information superhighway" is taking banking in the future. He decided the best way to do that was for us to visit the Center. Mike contacted Pat Flynn [an IBM customer analyst at the Center], and they put together a very rich agenda for us for the day. It ranged from a very sublime, almost philosophical discussion of the future of some of this "info highway" stuff, to very practical presentations on how other banks are using IBM's multimedia tools.

Q: In addition to yourself, who came from First Bank to the Briefing Center?

HEITMAN: There were eight of us altogether — including our network and telecommunications director, our chief software architect for the branch applications, our director of marketing, our end-user application manager, one of our strategic systems planners, and myself.

Q: Was the Briefing Center's presentation tailored to your interests?

HEITMAN: I think it was precisely tailored. Pat Flynn called me ahead of time and said, "What are you really trying to learn here?" She probed a lot to find out what was on our minds, and then made sure that they had offerings to match up with those things. So we had a very precise agenda, and the Briefing Center was very well prepared with a multimedia presentation about what multimedia means for us.

Q: Can you give an example of a particular item that met your needs?

HEITMAN: We had a couple of very specific items on the agenda, including how to use full-motion video technology to provide banking services to banks in remote locations. The Briefing Center did a very thorough job of explaining IBM's view of that technology, and they demonstrated it in very rich detail. It was exactly what we wanted to hear.

Q: What did you think of the Briefing Center facility?

HEITMAN: The facility itself was excellent. It was well equipped for multimedia presentations. The Briefing Center people were practicing what they were preaching, and I put a lot of value in that. If a company is selling concepts involving multimedia technology as being good for your business, you want to see that company using multimedia in *their* business. It is analogous to having your field reps carrying IBM ThinkPad® notebook computers.

Q: What did you think of the quality of people at the Briefing Center?

HEITMAN: Excellent. Pat Flynn is a very strong thinker and salesperson, knows how to keep an investment in time valuable, knows how to keep a meeting running on schedule, and the people she brought in were top caliber. They brought in Ray Peter, an industry specialist in banking from Charlotte, who talked to us about multimedia and other advanced banking applications that IBM was aware of. They also brought in a videoconferencing consultant who talked to us about what was practical today with two-way video, and how soon it might really be before everybody's TV set was a home terminal for interactive television. It was good stuff.

Q: Who besides yourself do you think will value coming to the Briefing Center?

HEITMAN: Anyone who wants to get technical information about multimedia applications will get an awful lot of it at the Center. The people there are very well prepared. They know their stuff. So if you want to know who is doing what in multimedia, and how they are doing it, that's the place to go.

But more importantly in our case — because we have an organization of many parts — we used the session as an opportunity to team together and get a shared vision of where we are going with multimedia. And I thought the Center and its staff did a really good job of getting a kind of stream of consciousness running through the content of the meeting, so that it all hung together.

Our day at the Briefing Center brought us very close together as a group about where we are going with this stuff, and it precipitated action to do things. Within the space of a couple of weeks, we started taking practical advantage of what we had learned. So it was an excellent visioning device. ●

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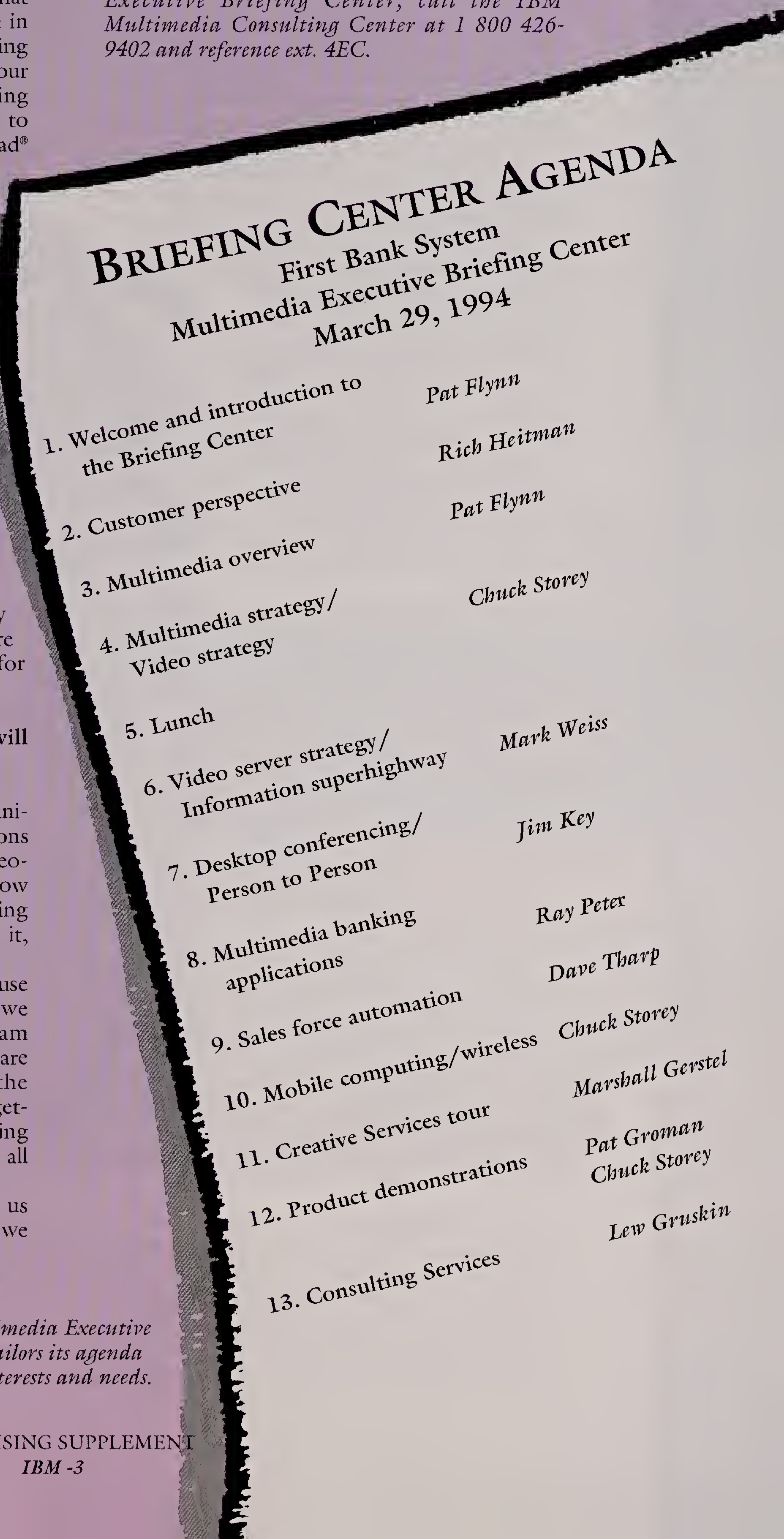
For more information on the IBM Multimedia Executive Briefing Center, call the IBM Multimedia Consulting Center at 1 800 426-9402 and reference ext. 4EC.



BRIEFING CENTER AGENDA

First Bank System
Multimedia Executive Briefing Center
March 29, 1994

1. Welcome and introduction to the Briefing Center	*Pat Flynn*
2. Customer perspective	*Rich Heitman*
3. Multimedia overview	*Pat Flynn*
4. Multimedia strategy/ Video strategy	*Chuck Storey*
5. Lunch	
6. Video server strategy/ Information superhighway	*Mark Weiss*
7. Desktop conferencing/ Person to Person	*Jim Key*
8. Multimedia banking applications	*Ray Peter*
9. Sales force automation	*Dave Tharp*
10. Mobile computing/wireless	*Chuck Storey*
11. Creative Services tour	*Marshall Gerstel*
12. Product demonstrations	*Pat Groman* *Chuck Storey*
13. Consulting Services	*Lew Gruskin*

The IBM Multimedia Executive Briefing Center tailors its agenda to each customer's interests and needs.

EXPLORE THE FUTURE OF MULTIMEDIA TODAY

You've seen the headlines — multimedia is taking off as *the* technology for the 1990s. Maybe you've even got a multimedia PC in your home or office. By now, you've realized that multimedia is more than fun and games — it's a quantum leap in communications that combines the power of the computer and television.

Whether you're a CIO or information technology professional, you've probably determined that multimedia will have a major impact on business computing someday. The productivity opportunities are immense. Video conferencing and collaborative computing will reduce business travel and meetings. . . . Multimedia user interfaces, backed by just-in-time multimedia job support, will improve the effectiveness of employees using business applications. . . . Mobile salespeople equipped with dynamic multimedia presentations will boost sales. . . . Networked kiosks and interactive television will revolutionize merchandising. . . .

Multimedia clearly marks an exciting technology transition as significant as the IBM PC in the early 1980s. Only this time, the transition may not be neatly wrapped up in a single box that you can buy off the shelf.

Some may want to hold off and wait for other pioneers to explore the "bleeding edge" of multimedia in business. But others know that by being a pioneer they will gain a vital competitive edge for their business.

The questions mount. Where should you start? What are the strategic technologies? How can multimedia help your particular business? How can it be integrated with your existing technology infrastructure? Who has the expertise, commitment and staying power to help you achieve long-term multimedia success throughout your business?

The IBM Multimedia Executive Briefing Center provides hands-on seminars tailored to your business needs.

Come to the source

If you want to find out what it all means in concrete terms for *your* business today and tomorrow, there *is* a solution — the IBM Multimedia Executive Briefing Center. Backed by IBM's depth and breadth of multimedia expertise, the Center provides a centralized, one-of-a-kind technology resource for exploring every facet of multimedia.

When you visit the state-of-the-art Center in Atlanta, you'll have the opportunity to develop an in-depth understanding of multimedia technology — how it is being employed by organizations around the world, where the technologies are moving in the future, and how multimedia can be integrated into your business.

IBM pioneered multimedia in the early 1980s. The IBM InfoWindow® system, introduced in 1986, became the industry's first standard for full-motion, interactive video on the desktop. The IBM ActionMedia II adapter, introduced in 1991, was the first product to deliver full-motion video playback from a compact disc. Today, IBM is investing heavily in all aspects of multimedia technology — including such important developments as speech recognition, multimedia networking and video on demand.

More than simply a technology leader, IBM has also led the industry in developing powerful multimedia business solutions. Exploiting its own multimedia systems, for example, IBM developed one of the world's largest multimedia training libraries for its employees. And beginning in 1992, IBM has helped Holiday Inn roll out multimedia training for its more than 1,600 worldwide hotels. Keeping at the cutting edge, IBM today is working with Hollywood director James Cameron *(Terminator 2)* to develop digital special effects in movies. IBM is also working with Blockbuster Entertainment to roll out networked multimedia kiosks that can make a customized audio, movie or computer compact disc in minutes.

Explore multimedia firsthand

Multimedia is impossible to imagine without actually experiencing it. "Multimedia is a nebulous concept," says Dave Tharp, manager of the Briefing Center. "You can tell people about it, or they can read about it, but they will not form a mental picture of what it means until they see and feel it."

At the Briefing Center, you'll not only witness the power of multimedia, but you will have the opportunity to explore emerging multimedia technologies and trends in multimedia usage.

The Center's interactive sessions also address your particular business concerns, enabling you to begin developing an accurate blueprint for integrating multimedia in your business and technology strategies.

"If the customer is looking for kiosk applications, we will discuss kiosk hardware, software and networking considerations, and show examples," says Chuck Storey, systems integration manager at the Center. "If the customer has an industry-specific application in mind, we will have an industry expert on hand to talk about that particular industry. If appropriate and non-confidential, we'll show them demos of applications used by others in their industry, such as just-in-time training. Usually, the customer can get 'hands on' with installed multimedia applications."

"The Center gives customers a better understanding of the power of multimedia and what impact it can have on their company's bottom line," adds Tharp. "It also gives them a real sense of the help and resources available through IBM. The Center highlights IBM's unique strengths in multimedia, featuring demonstrtions on everything from a laptop to an AS/400.® We can show multimedia across the enterprise."

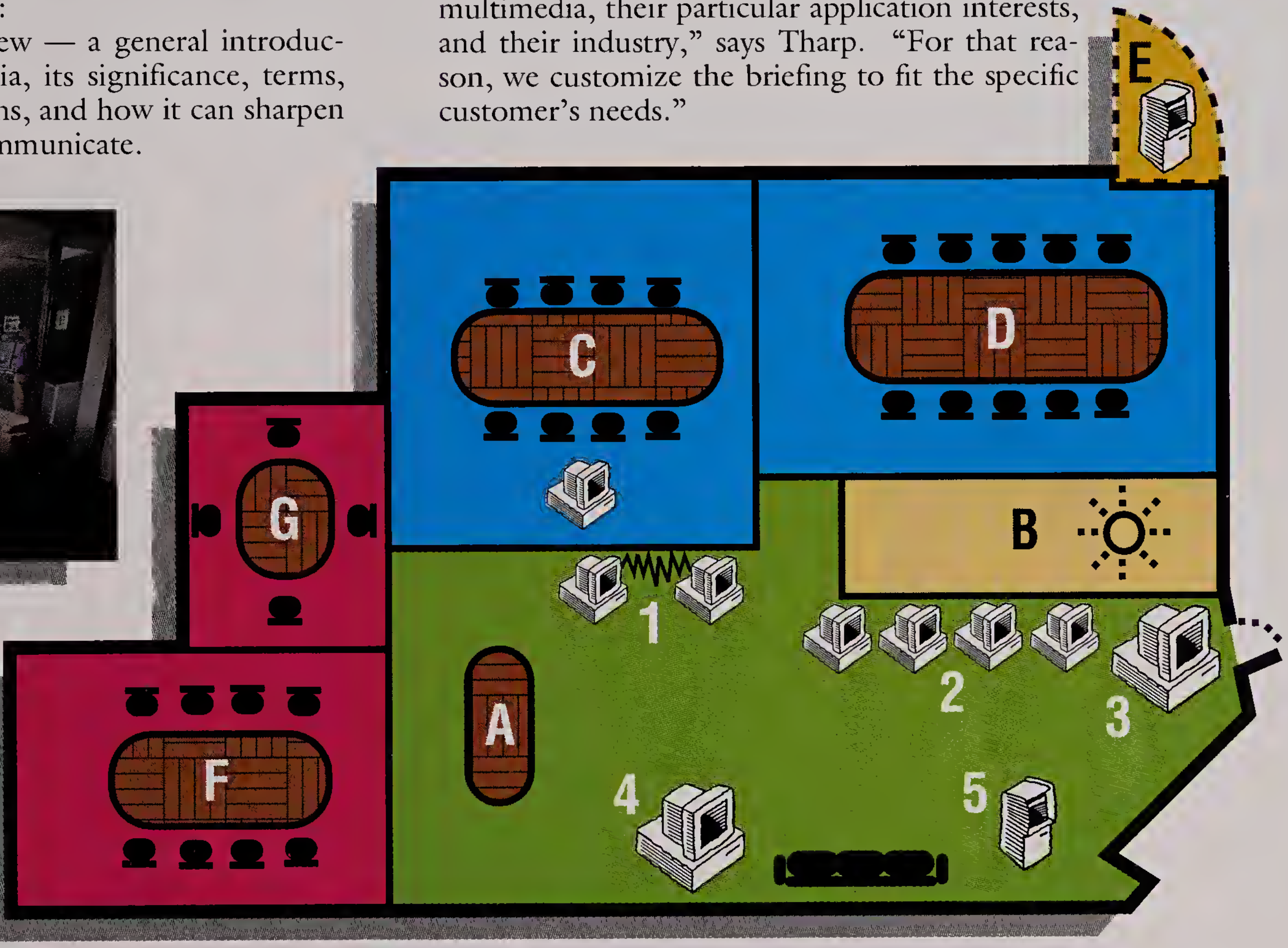
Seminar topics are tailored to meet your specific needs and include:

- Multimedia Overview — a general introduction to multimedia, its significance, terms, specific applications, and how it can sharpen your ability to communicate.
- Multimedia Strategy — learn about the latest trends in technology, including hardware, software and industry application directions.
- Product Update — the latest on multimedia hardware.
- Software — learn how to select the best multimedia tools for your organization and projects.
- Applications — learn how multimedia is used in the real world across various industries and application types, such as training and merchandising. For example, a sales force automation seminar reviews the rationale behind automating the sales force using multimedia on laptop computers.
- Human Interface — understand the value of integrating sight, sound and touch to make the human/machine interaction transparent and intuitive.
- IBM Consulting and Services — learn how IBM consultants can support your multimedia ventures from application analysis and creative content development through systems integration and installation.

Tailored session topics

"Every customer is different in their understanding of multimedia, their current utilization of multimedia, their particular application interests, and their industry," says Tharp. "For that reason, we customize the briefing to fit the specific customer's needs."

The IBM Multimedia Executive Briefing center offers more than 4,400 square feet of exhibits and meeting space. A wide range of multimedia technology and applications can be explored "hands on" by visitors.



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B. *LAN server.*

C. Conference room equipped with multimedia projection equipment.

D. Larger conference room, also equipped for multimedia.

E. IBM kiosk with consumer catalog sales

F/G. Dining rooms.

"Prior to the briefing, we work with the IBM account team to ensure that the briefing agenda is tailored to the customer's interests," says Pat Flynn, a customer analyst at the Center. "Even though we might have two similar companies coming in the same week, the content varies according to customer needs."

Hot topics include: "the information superhighway," multimedia networking, video on demand, digital conversion of analog video, sales force automation, distance learning, just-in-time training and networked kiosks. Some customers are even interested in replicating the powerful "multimedia briefing center" concept in their own facilities, for use in internal presentations and training, or for briefings with their own customers.

The Center will frequently provide specialists knowledgeable about topics of particular customer interest. "If they are definitely interested in something specific, like the information superhighway, and we know they've got in-depth information already and need more detail, then we'll bring in a specialist," says Pat Groman, engagement manager. The specialists can talk to them specifically about the video-on-demand trials that are going on, and about some of the issues and concerns posed by interactive television.

"We often will also have a consultant at the briefing, who can follow up with a planning session if the customer is interested," Groman continues. "The next logical step is to prepare a proposal that focuses specifically on that customer's requirements and business needs.

"Or, it could be that the customer already has requirements fairly well determined and wants to get started working with our Creative Services group," continues Groman. "Creative Services can give a presentation and also take the customer into the production lab to show examples of animation, graphics and video capabilities."

Helping solve business problems

More than 300 companies have attended briefings at the Center. "There's greater and greater multimedia interest out there," says Tharp. Most customers are referred to the Center by their IBM account team, which will often accompany the customer to the center.

"I think that the Multimedia Executive Briefing Center is a critical element for showcasing multimedia," says Martha DeBiasi, an IBM senior client rep based in Hickory, N.C. "Multimedia is a very complex and somewhat confusing technology, and the Center really helps the customer focus on what it is, how it works and what it can do for them in their business. The Center is effective, I believe, because it uses the products to tell the story. I support it fully, and I encourage IBM client reps to invite their customers to take advantage of this facility."

Adds Tharp, "The Center allows the customer to become comfortable with our expertise, our resources and our ability to help them solve problems. Above all, we try to help customers understand how multimedia can fit perfectly with their overall business strategy — and give them a lasting competitive edge." ●

* * *

For more information, call the IBM Multimedia Consulting Center at 1 800 426-9402 and reference ext. 4EC.

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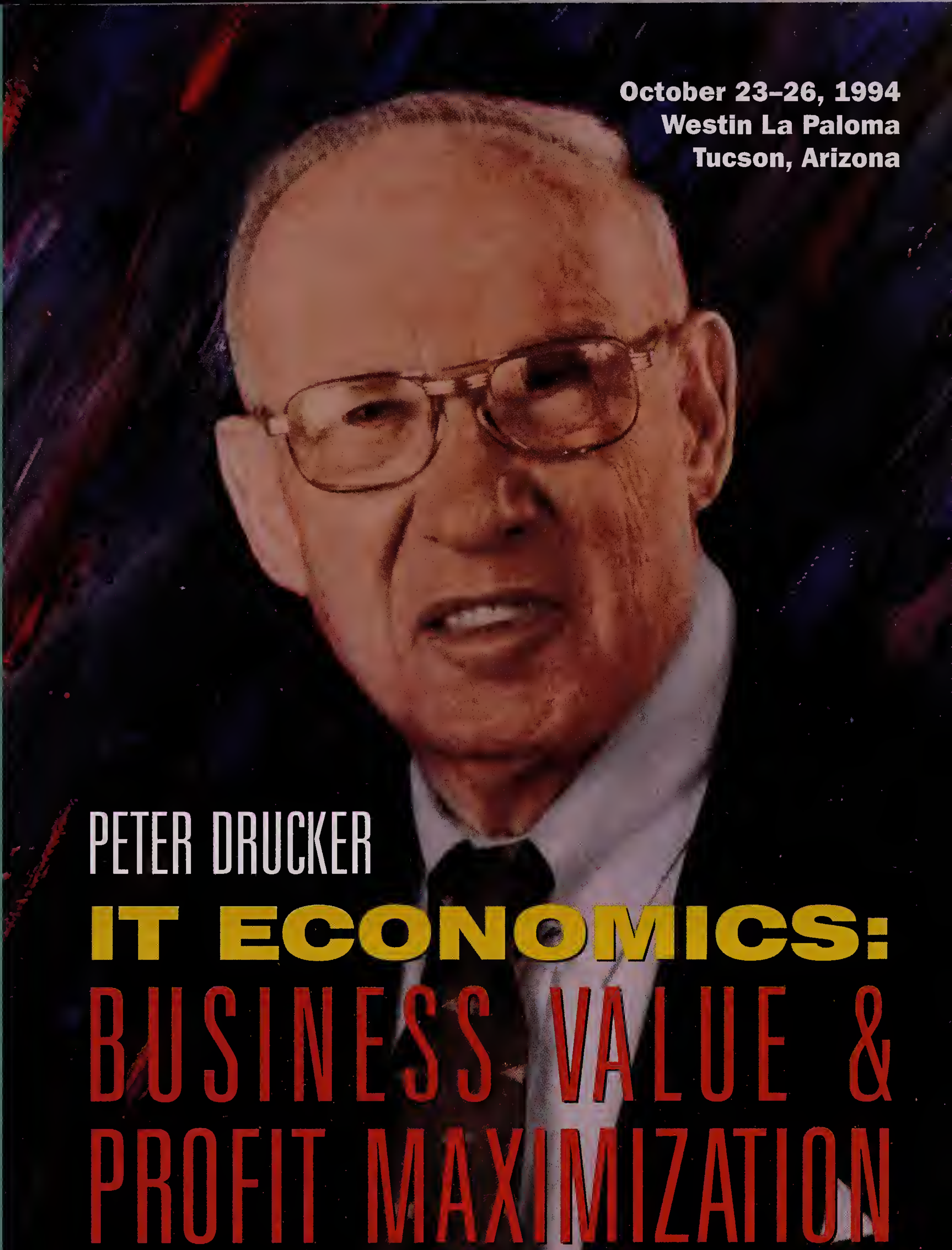

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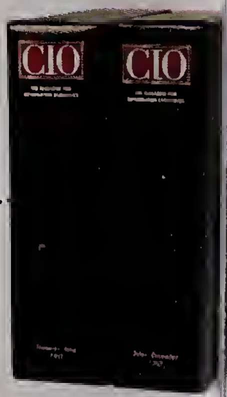

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If You Are the CIO of a Fortune 1000 Organization or Hold Equivalent Public Sector Responsibility, Please Read This Letter.

September 15, 1994

RE: Measuring the Return on Investment from Information Technology

Dear Executive:

On January 22–24, 1995, *CIO* Magazine and its partners will host the third annual **ROI•T** (**R**eturn **o**n **I**nvestment from Information **T**echnology) **Executive Retreat**. The Retreat brings together over 100 corporate, government and business school leaders in information technology and strategy to focus on demonstrating and articulating technology's return on investment.

This program, specifically designed for executives with responsibility for effectively deploying and measuring the value of IT in their organizations, will be chaired by **F. Warren McFarlan**, Senior Associate Dean, Director of Research and Ross Graham Walker Professor of Business Administration at Harvard Business School. He will lead the participants through this two-day immersion in IT metrics and conduct a case study that highlights a technology adoption decision and its consequences to an organization's profitability.

We will also honor the recipients of the third annual **ESPRIT** (Excellence in Strategic Partnering for Return from Information Technology) Awards profiled in the January 15, 1995 issue of *CIO*.

Last January, CIOs from companies such as Procter & Gamble, McGraw-Hill, Federal-Mogul, the US Army, Texas Utilities, Grumman, Xerox, America West, Beneficial Life Insurance and Arrow Electronics were privy to the most innovative thinking in **ROI•T** methodology. Make this January *your* opportunity to join this prestigious roster of IT leaders and learn the latest in applying metrics to IT. Please call us at **800-355-0246** for information about the 1995 retreat.

Sincerely,

Joseph L. Levy
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EDUCATIONAL REFORM

REALITY BYTES

There's been no shortage of talk about educational reform in recent years, but one state is using IT to take action.

As part of its ongoing Schoolyear 2000 initiative, the state of Florida is overhauling its educational system to better reflect what's demanded of graduating students in today's society. Working on the premise that the current system is obsolete, researchers at the Center for Educational Technology at Florida State University have designed a new system that shifts the focus from the teacher to the student and allows students to learn at their own pace. In this model, the student is viewed as a customer rather than a product; teachers assume the roles of coach and consultant, and class work is more relevant to daily life.

Technology plays a critical role in supporting both teachers and students. "For today's children to grow and succeed in the expanding world around them, the educational system must dramatically change," says Wendy Cullar, program director of Schoolyear 2000 in Tallahassee. "We believe this can be achieved by integrating today's mobile computing technology into the learning process."

The Schoolyear 2000 model is being tested in seven Florida districts, with two more to be incorporated this year. So far, the technology includes 325Point pen tablet computers from Fujitsu Personal Systems Inc. loaded with software from American Management Systems Inc.; these are used by teachers to make, record and analyze observations about students' progress and to report to parents.

Future plans include a teacher support system that incorporates both the tablets and docking technology, says Cullar. Also in the works are systems to support students, including mobile technology and networking capabilities. Prototypes of both components are expected to go into testing this year. Companies involved in the development are Encyclopedia Brittanica Educational Corp., Chancery Software Ltd. and IBM Eduquest.

To those of us who remember school before the arrival of the calculator, all of this may sound frighteningly futuristic. But today's students are apparently more than ready: During a demo last year, Cullar says, "one little boy wanted to know, 'Where were the servers going to be located? How would they be connected?' " ▬

DEGREES OF FREEDOM

You live in North Dakota, you want an M.B.A. from the University of Phoenix and your spouse refuses to relocate? No problem. The school has an online program that lets students work toward academic degrees no matter where they live or when they can do the work. Even the system itself isn't in Phoenix; it's in San Francisco.

Launched in 1989 with eight students, the program now enrolls 1,000 worldwide; about 350 have earned bachelor's or master's degrees. Offered through CompuServe, it is among a growing number of "distance learning" options that let students earn credits by computer. Students use modems to dial in anytime and from anywhere; they can download lectures and assignments, post to discussion groups and submit homework. Some schools also accept applications, placement tests, tuition payments, transcript requests and book orders online.

Most schools offering distance learning still educate the majority of their students in traditional classrooms. But a few colleges operate almost entirely in cyberspace. At Thomas Edison State College in Trenton, N.J., for example, the physical campus consists of a single well-wired administration building with no classrooms. More than 8,600 undergraduates from all 50 states and 68 foreign countries learn by video, audio, and one- and two-way videoconferencing as well as online.

Critics say distance learning can be isolating and difficult to monitor. But students, typically working adults in their 30s and 40s, counter that classrooms without walls let them overcome barriers of time and distance that might otherwise keep them out of school. ▬

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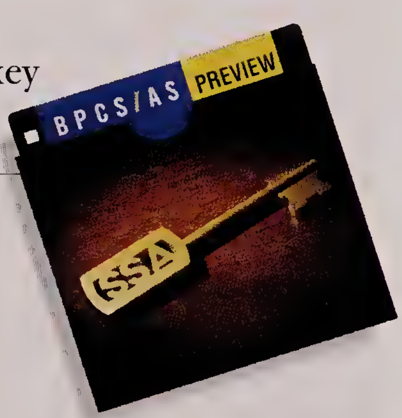

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Creation Theory

Different people have different creative styles when it comes to solving problems. Recognizing the value of each approach is one key to effective teamwork.

BY CHARLES W. PRATHER

All of us are paid to solve problems. Think about the core skills you need to do your job well, and you will most likely find problem solving at the top of the list. And it is critical: How well we solve problems affects how successful our companies will be.

At the heart of problem solving is creativity, which we call upon as we define the problem, generate ideas to solve it and develop plans to carry out the selected idea. Before we can improve our problem-solving skills, we must first realize that there are strikingly different styles of creativity, each of which is particularly well-suited for solving certain types of problems.

The concept of creativity (or problem-solving) styles was originally developed in the early 1970s by Michael Kirton at the Occupational Research Centre near London. Kirton developed a theory that there are two principal styles of creativity—adaptive and innovative—and that most people naturally prefer one style over the other. (To identify and measure the strength of an individual's preferred creativity style, Kirton devised a 33-item questionnaire now known as the KAI Inventory.)

ILLUSTRATION BY KAZUSHIGE NITTA

People with an adaptive problem-solving style generally seek to make an existing system better. Such people tend to undertake initiatives to improve the operating efficiencies and reduce the costs of any activities for which they are responsible. They will do such things as seek to ensure better follow-through on commitments and schedules or a higher rate of accuracy in shipments and invoicing. These people bring high immediate value to any business, and everybody knows it; without them, the business would quickly fail.

In contrast, innovative problem solvers seek to make the existing system different. People who prefer this style tend to question and challenge the system rather than look for ways to perfect it. They are agents of change; they work toward new ways of getting things done and, ultimately, toward changing the fundamental nature of the business. Such people might invent new manufacturing processes or bring technology to bear on the goal of entering new markets. They ensure an enduring business because they help the enterprise remain abreast or in front of the change curve, responsive to changing customer needs and fresh business opportunities. Thus, they bring high long-term value to any business (though their short-term value is more difficult to measure).

People invariably do best when they are in jobs that require the problem-solving style they prefer. When you see someone struggling under their job responsibilities like a donkey under a heavy pack, the cause can usually be traced to a great mismatch

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between the problem-solving style demanded by the job and the one the job holder prefers. The greater the mismatch, the more unproductive energy must be expended to cope with the job's ill-fitting demands—leaving less available energy to do the job. The results are high stress, possible poor performance, low job satisfaction and eventual burnout.

Being aware of these stylistic differences and their ramifications can be a key to improving team performance. How? The answer lies in recognizing that team problems call for a variety of problem-solving styles. So, the fact that all members of a team have their own preferred styles means that each can contribute distinct value.

For example, suppose you have a problem requiring a solution that fits within existing regulations or is compatible with the existing system and is also readily accepted by the organization. This might mean finding a way to speed processing of orders or invoices or to make sure that the right product gets shipped to the right customer. Problems of this sort usually call for making the existing system work better, and the team members most likely to do an excellent job are those who prefer adaptive problem solving and who are the agents of stability.

When you see someone struggling under their job responsibilities like a donkey under a heavy pack, the cause can usually be traced to a great mismatch between the problem-solving style demanded by the job and the one the job holder prefers.

But suppose, on the other hand, that your product line is growing old and your competitors have outdone you with new products that meet needs your customers didn't even know they had. Problems of this sort usually call for changing the system rather than tweaking it, going outside the paradigm of the current business. The team members most likely to excel here are those who prefer innovative problem solving, who are the agents of change, not stability, and who enjoy the challenge of breaking "out of the box."

The strength and effectiveness of a team depends on the extent to which the differing styles of the members are used and valued. While most people accept this truth intellectually, their gut reaction doesn't always agree. When participants in problem-solving or creative-thinking workshops are asked to list adjectives describing those whose style is different from their own, they tend to list only devaluing adjectives. Adapters describe innovators as weird, off the wall, flaky or not serious. Innovators characterize adapters as dull, boring, string savers or bean counters.

People are shocked by their own words when reminded that they have just devalued their own team members. When asked instead for *valuing* adjectives, adapters describe innovators as bringing newness, being spontaneous, having a fresh approach or providing unexpected solutions; innovators describe adapters as trustworthy, steady, reliable and committed.

With the increased emphasis today on team-based organizational strategies, it is important to understand the value of *differentness*. It is by appreciating and making the most of individuals' different problem-solving styles that managers can further the success of their companies. CIO

Charles W. Prather is the founder and president of CW Prather Associates Inc., a consulting company based in Hockessin, Del. Previously, he was manager of the DuPont Center for Creativity & Innovation.

What's Your Style?

Short of filling out the KAI Inventory, how do you know where you fall on the adaption/innovation continuum? Try this simple test: Without looking in your wallet, do you know exactly how much money you have and how it's arranged? If you do, and if you've arranged the money neatly, in ascending order with all the bills facing the same way, then you would probably love a job that requires attention to detail. You probably balance your checkbook to the penny each month—just because you want to. Examples of professions that require this style include surgeon, dentist, pharmacist and accountant.

On the other hand, if you have no idea how much money you have, or if it is stuffed at random into your wallet or purse, you have little interest in details (which you regard as trivia) and would much rather see the big picture. You have probably been criticized for leaving clothes lying around, and you can't seem to understand why all the fuss—usually from your spouse or partner. You probably never balance your checkbook, and if you do it's only because you must. Examples of careers that require this style of problem solving include sales and advertising, research and development, new-product scouting, finance and law.

–C.W. Prather

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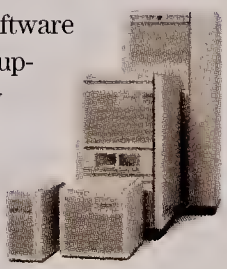

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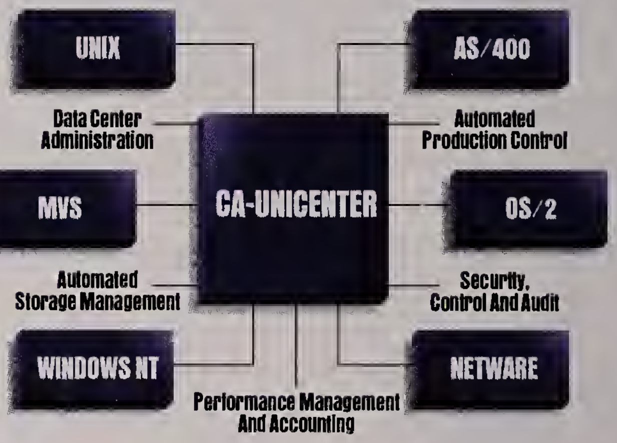
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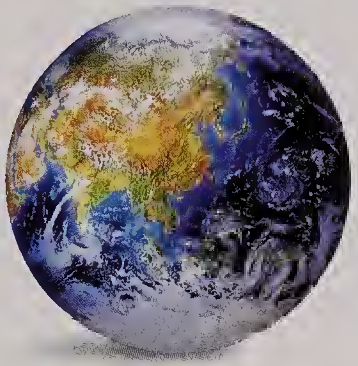

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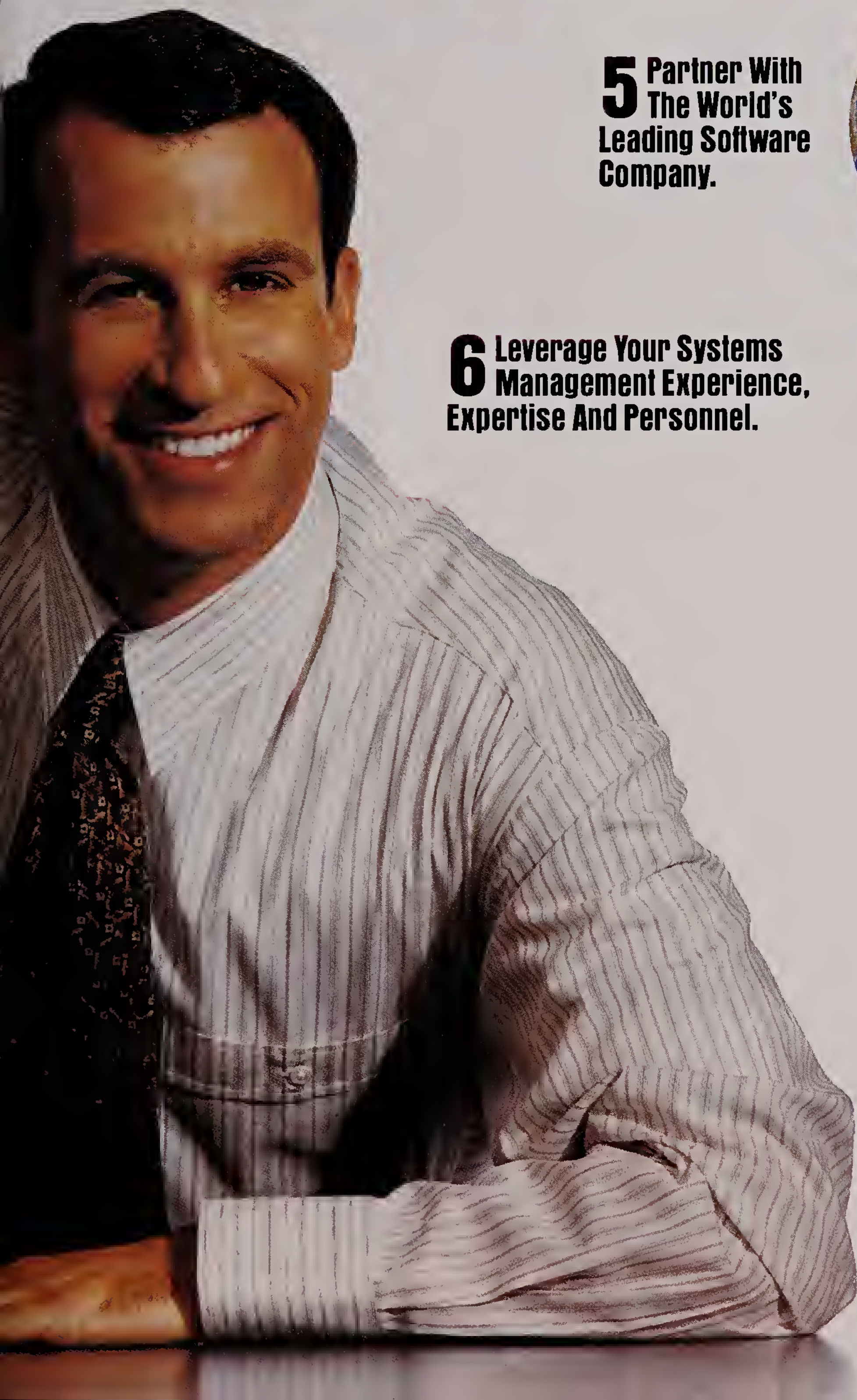

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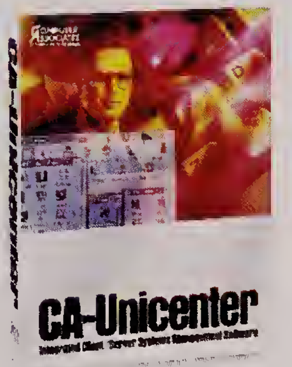

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LEADING *by* EXAMPLE

In its own struggle to turn itself around, IBM Canada serves as a beacon for its prodigious parent

BY RICHARD PASTORE

TOUGH TIMES FOR IBM. IT'S A REFRAIN THAT'S BECOME ALL too familiar in the past couple of years, as have the reports of how Lou Gerstner and company will fix things up. The company's information systems groups are under fire, too. Like IS organizations throughout the corporate world, they are challenged by cost pressures, justification issues, a rising tide of user requests and the need to stretch limited resources.

IBM Canada Ltd., a bite-size portion of the IBM Corp. empire based in Markham, Ontario, happens to be something of a bellwether for the corporation; think of it as the right side of the IBM brain, where some of the more-innovative thoughts originate before spreading outward. Nowhere has the formula for a new and improved IBM—service emphasis, team orientation, business-unit empowerment and drastic downsizing—been more immediately and dramatically executed than in Canada, according to consultant Steven Rayner, who praises IBM Canada in his book *Recreating the Workplace* (Oliver Wight Publications Inc., 1993). And because it's in a smaller market, the subsidiary has been a testing ground for new management ideas that are later embraced in the United States, according to Bob Djurdjevic, president of Phoenix-based Annex Research. "IBM Canada has been ahead of the U.S. in growth and understanding of how to manage a service-oriented business," he says.

The Canadian company hit the financial skids a little later and less hard than its parent corporation, and it's not yet clear if the slide's been reversed. But President and CEO William Etherington is garnering praise from industry and management gurus for his willingness to make cuts while leveraging leading-edge management techniques to improve quality. He's partitioned the firm into separate business units with varying degrees of autonomy and responsibility for their own bottom lines. Under his tutelage, the company has pursued a team-oriented culture, promoting information sharing and collaboration across functions. Such efforts helped earn IBM Canada a spot in this year's CIO-100, published last month.

WILLIAM ETHERINGTON: *leading IBM Canada into a brighter future*

PHOTO BY PETER TANG/FIRST LIGHT

TIME LINE

- William Etherington becomes president and CEO
- Company suffers first loss in 75 years
- Begins creating and empowering self-sufficient business units and teams

- Accelerates downsizing, eliminating 2,000 of 13,000 jobs companywide
- Posts small profit while parent company loses $5 billion
- User surveys reveal dissatisfaction with IS performance

- Begins charging users for IS services
- Creates online availability tracking and skills database for IS developers
- Joins IT best practices benchmarking study
- Continues downsizing, trimming total staff to 8,600
- Loses $130 million (Cdn.) as revenues drop 1 percent

- Outsources networking and host operations
- Hires director of information technology to act as overall strategist

ETHERINGTON'S MANIPULATIONS have reverberated in the halls of IS, where reengineering efforts began in earnest in late 1992. User surveys conducted at that time showed general dissatisfaction with IS: The cost of deliverables was out of whack with their value, there was a lack of responsiveness to user requests, and reliability was spotty.

The challenge of addressing these shortcomings was exacerbated by the downsizing. IBM Canada has seen its staff of 13,000 cut down to today's 8,000. This included a 37 percent reduction in IS personnel, now totaling 534 people. On top of that, since 1989 the IT function has lost 35 percent of its total funding. That's a tough environment in which to improve service to internal customers whose needs are swelling in volume.

So how did these Canadians pull it off? Their first step was to execute the cuts required without tearing the heart out of the IS department. The prime target for greater IS efficiency was data-center consolidation. The 11 data centers of 1989 have been reduced to one, and 48 processors have been scaled down to 11. "We started the consolidation in 1989, ahead of IBM's worldwide consolidation effort that's been taking place over the last two years," says Chris Alford, director of information technology. IBM Canada's head start was purely cost-driven, she says; the smaller company couldn't afford to bide its time.

Sometimes the pressure to cut can lead to razor burn. IBM Canada dissolved its internal advanced-technology research group—a move that turned out to be a mistake. "We disbanded them because of the cost and because we weren't translating [the new technology research] fast enough into something that could benefit the company," says Gaye Emery, vice president and general manager for marketing, who heads reengineering and oversees the IS function. The onus to investigate new technology was instead placed on individuals—a sort of spare-time assignment. That didn't work, so the advanced-technology group will likely be reinstated soon, Emery says.

There would be more economizing later, but first the group turned its attention to user issues. Here, IS's remedies mirrored those Etherington was deploying for the corporation as a whole—instilling a service orientation and a competitive drive where once there was mostly arrogance. "We decided we must earn the right to be a provider," Emery says. Beginning in 1993, "we gave our business units a choice of whether to buy IS services from us [or from other providers]. So, we had to make our shop very competitive on the rates we charge, on our delivery speed and in the quality of our relationships."

At the same time, IS shifted systems accountability and financial risk to the user community by adopting a chargeback program. Business units, responsible for their own bottom lines thanks to Etherington's redesign, now were responsible for the dollars they invested in IT.

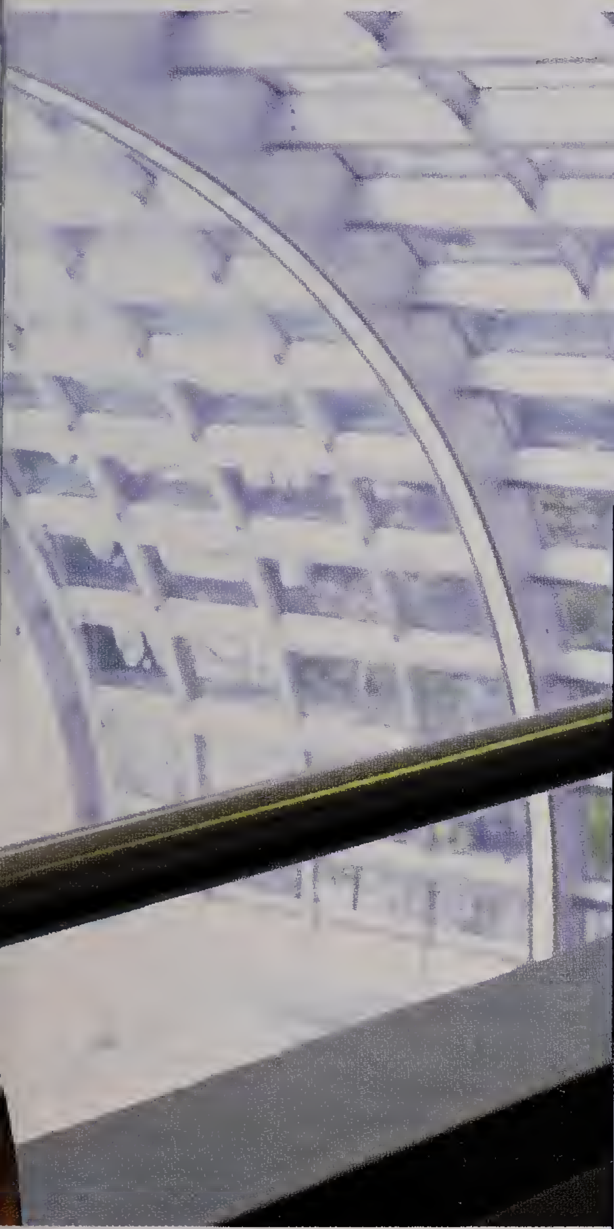
The financial responsibility has crafted a new, more-prudent user.

PHOTO BY PETER TANG/FIRST LIGHT

"They've been very pragmatic under this direct-charging system, focusing more on cost," Alford says. "They ask for what they can pay for." User interest is now keenest in client/server systems because of the productivity payoff, she notes.

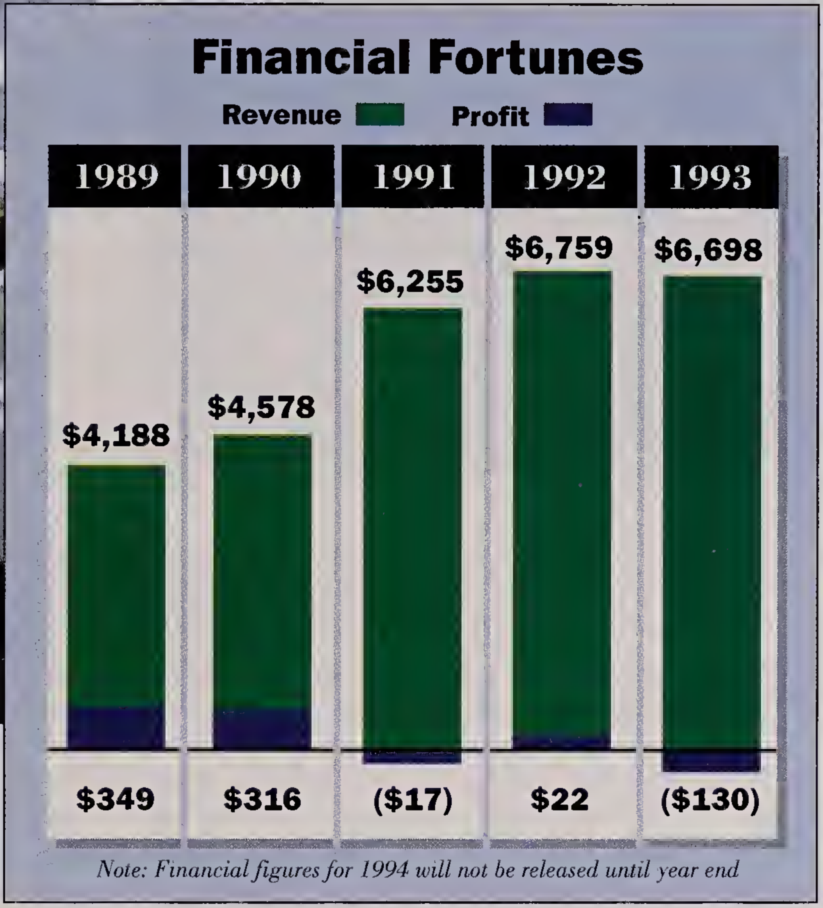
Chargeback, hardly a radical technique, nevertheless was not generally accepted at IBM before the Canadian firm tried it. That may soon change. Charging back was singled out as a best practice in a 30-company benchmark study conducted by IBM Corp.'s consulting group. The parent company is now giving activity-based costing a look, along with other pay-for-service schemes, according to Alford.

WHILE CHARGEBACK may cut waste and improve quality by steering users toward high-impact IT projects, it won't necessarily make the internal development process more responsive. To tackle this issue directly, IBM Canada last year concocted an online availability calendar to speed project assignment and delivery. When an IS project request comes in, an availability manager can check at a glance who's doing what and who will be free for the assignment. This way, people can be committed to the development team within hours of the request, Emery says.



CHRIS ALFORD: *a champion for cross-business-unit initiatives*

The calendar has since been combined with a skills database: an online resume for each developer that keeps track of the engagements they've worked on, what skills they've used and what proficiency level they've attained in areas such as object-oriented programming. When a request comes in, an IS availability manager questions users to ascertain the IS skills required and match the right available developer to the job. By linking user requests with ability requirements, IS management has been better able to gauge what talents are most in demand and guide training appropriately. These online personnel systems are another Canadian-spawned innovation being considered for reworking and global IBM implementation.



Note: Financial figures for 1994 will not be released until year end

There was an unanticipated side effect associated with the online skills database, however: Developers with particular skills were in danger of becoming as typecast as Bela Lugosi, always playing one type of role and missing the opportunity to develop other proficiencies. To smooth ruffled feathers, managers had to sit down with developers to discuss their skill goals one on one.

With IS staff shrinking 37 percent, IBM Canada next looked for ways to get the most out of its remaining resources. Taking a cue from the rest of the company, the IS group implemented a team approach to development, spreading responsibilities and sharing the increasing workload. These development teams come together to work on specific systems projects. Members of the affected user population are matched with IS staffers possessing the skills appropriate to the project. The teams have self-management authority, and to keep things as egalitarian as possible, the team leader is typically not of the management ranks. When the project is completed and everyone is satisfied, the team typically disbands.

Partnerships are another avenue for extending the capabilities of a thinned-out organization. In IT development projects for external customers, IBM Canada has partnered with external developers to leverage outside skills and get the job done more expediently. One example is a project to upgrade Canadian Patent Office systems to optical-disk imaging technology. "We are the prime contractor on that, but there are several vendors that are part of the relationship," says CEO Etherington. Though IBM Canada may drive the process, "we will also take advantage of what we can learn from our partners."

The Canadian subsidiary is also more apt in these lean times to partner with fellow IBM groups around the globe. The U.S. and Canadian IS units are now collaborating on a database system that will analyze customer buying patterns, something along the lines of the sophisticated systems used by catalogers like L.L. Bean Inc. The analysis will help in mounting marketing campaigns for vertical industries like insurance across North America. As more such applications are jointly developed for global use, IBM Canada's internal development group will shrink cor-

GAYE EMERY: *"We had to make our shop very competitive."*

respondingly. Leveraging others' resources will allow a development budget cut of 95 percent by the end of next year from 1992 levels, Alford says.

THE IBM-IBM TEAMING applies to operations as well as development. IBM Japan runs some of its office applications on U.S.-based machines. "We're all focusing on consolidation of operations and sharing MIPS to make us more cost-efficient," Alford says. IBM Canada is now investigating offloading its own office and other systems to fellow subsidiaries elsewhere.

The pressure to economize also drove IBM Canada to follow its parent's lead in adopting an outsourcing strategy early this year. The Canadian group outsourced its networking function to subsidiary Advantis and its systems operations to partly owned Information Systems Management Corp. (ISM), the Canadian equivalent of IBM Corp.'s Integrated Systems Solutions Corp. outsourcing company. IBM Canada has loaned 85 of its systems staff to ISM, where they are transferring skills and integrating the two operations.

Unlike IBM Corp., IBM Canada decided to retain application development and maintenance in-house, since efforts to improve those functions' competitiveness and quality had proved so successful, according to Alford. Networking and host operations, with their greater opportunities for economies of scale, were better choices for outsourcing.

The outsourcing arrangements provoked corresponding changes in the IS-management structure. "Now we need a holding-company view of IT, someone to champion cross-business-unit initiatives and move them forward," Alford says. Her position, which reports to Emery's, was created in January 1994 for this purpose.

"Before, there was no centralized view of IT," she says. Although development and maintenance areas have their own managers, "I take a more-strategic view than operational," she explains. Alford also acts as contract manager and liaison for the outsourcing vendors, and she represents the group in the benchmarking study and in efforts to partner with other IBM subsidiaries.

> *IBM Canada decided to retain application development and maintenance in-house, since efforts to improve those functions' competitiveness and quality had proved so successful.*

Has all the tinkering resulted in better IS service and a better IBM Canada? The company won't divulge any financial reports for 1994 until next year, so the effect on the bottom line remains to be seen. However, internal customer satisfaction has risen dramatically, Emery says, and she has the audits to prove it. Users grade responsiveness daily by filling out an online survey when they log off their systems. For every application developed, users rate how well pre-established success factors have been achieved. In use since 1992, the satisfaction survey is the same one the company uses with its external IT customers. The fact that these surveys are showing improvements should be heartening news for every IS shop that has an IBM box in its inventory. CIO

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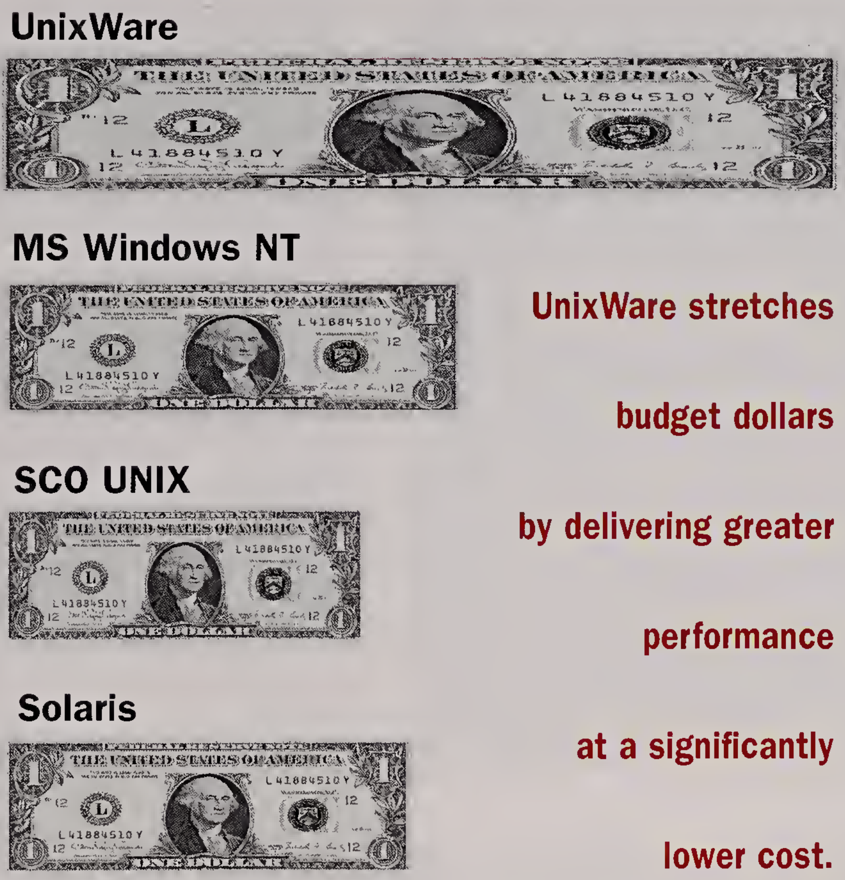

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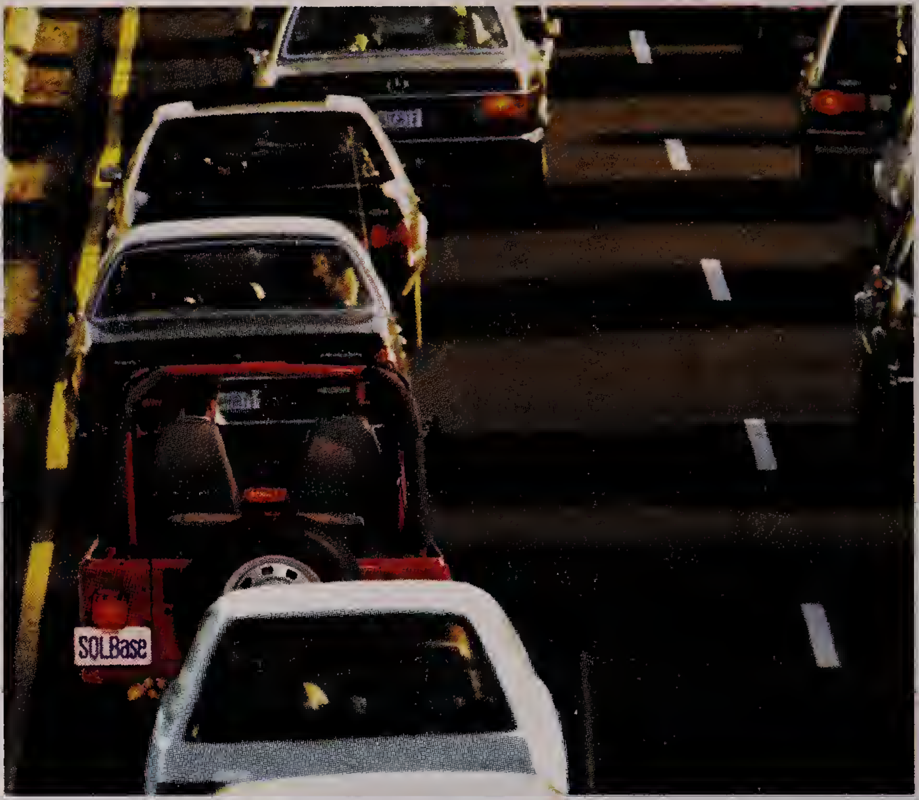

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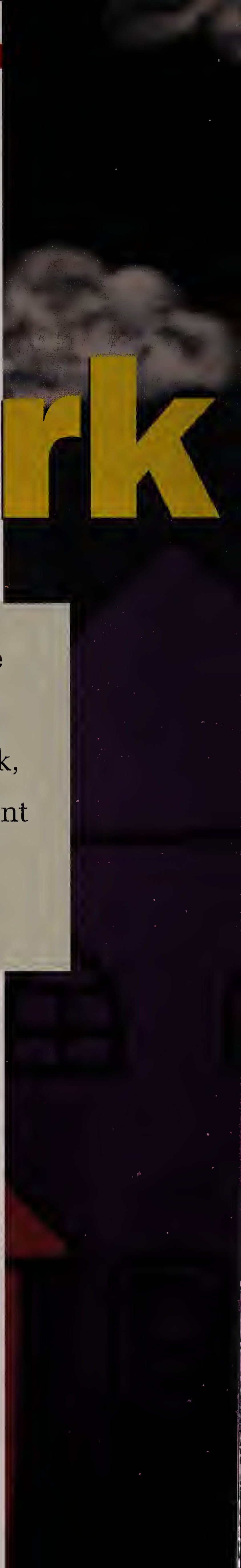
Making Your **Net Work**



In this age of the ever-expanding corporate network, careful management is more critical than ever

BY PETER CASSIDY

THESE DAYS, CIOS ARE electronic stockmen charged with erecting fences to define the boundaries of that virtual frontier: the enterprise network. But with the unrelenting growth of most networks today, that's no small challenge. Just when CIOs think they have come to the edge and can plant their posts, string some wire and mark their territory, it rushes away from them again in every direction.

For some agents in the enterprise, like those energetic types in marketing and R&D, the notion of unlimited connectivity is as charged with adventure as any Louis L'amour novel. They may watch with glee as LANs increasingly stretch the office environment from the desk to the field and as WANs expand to incorporate new enterprise sites and business partners. But it is CIOs who bear the onus of creating, charting and managing the territory and of making the various growing LANs and WANs productive parts of the overall enterprise network. Those who fail to do so might as well tear down the posts and wire and let the herd loose.

John Collins was greeted by a scene of raw network anarchy when he arrived last March at Plaza Home Mortgage Corp. in Santa Ana, Calif. Forty branch offices around the country were using a variety of LAN strategies, and the routing technology was iron-age hardware. "None of them had network-management capability. The only way we knew if one of the LANs went down was if someone called and said so," he recalls. Fortunately, Collins, the newly appointed CIO, was formally deputized by executive management to do something about it.

For Plaza—the third-largest thrift mortgage originator in the United States, says Collins—the state of the network was a real threat. The company operates in a mature industry, where the most important competitive factors are underwriting—which speaks to the investment quality and, therefore, the marketability of the instruments produced—and productivity, or raw business efficiency. Without a fast, dependable network, Plaza's ability to compete

PHOTO BY LARA JO REGAN / SABA

JOHN COLLINS: *Plaza Home Mortgage's network was designed with an eye to the future.*

LARA JO REGAN/SABA

DENNIS KOTECKI: *"Our network investment was more than stimulated by Hillary Clinton and this whole idea of health-care-information sharing."*

on speed was compromised.

Collins knew he needed a common platform for the company's networks in order to simplify management and maximize efficiency. The current, heterogeneous state of the networks was very complex, increasing the chances of a breakdown. And without the ability to monitor the networks' efficiency, he had no way of gauging how well they were performing—or of predicting and heading off a breakdown.

Collins deployed Novell Inc. servers running Internet protocol exchange (IPX) at the home office in Santa Ana and in the branch offices around the country. He also installed CrossComm Corp.'s ILANS as the branch routers at nine regional sites. The result: a common LAN platform and flexible, robust internetwork connectivity.

WAN transport technologies, meanwhile, had to be flexible enough to link the LANs to the Santa Ana office as well as to the service bureaus that process the mortgages and the credit bureaus that provide credit and other important underwriting data through electronic data interchange. Collins deployed a CrossComm XL80 parallel router in Santa Ana that is linked to the branch offices, routing data with Systems Network Architecture protocols and a Hewlett-Packard Co. IPX routing daemon that tracks Unix's IP-derived addresses. WAN data communications are handled through frame-relay service.

Now, data flows from the branches to the home office and to the third-party processors with a great deal more control at Collins's end. The network-management software (CrossComm's Internetwork Management Software, which comes with the router) allows Collins to monitor data traffic and performance at any network level. As a result, he can now manage the network proactively.

Indeed, Collins is also planning a disaster-recovery system for the network. Because of Plaza's location in earthquake-prone southern California, Collins wants to make sure the network remains safe even when "the big one" hits. To do this, he plans to install a Hewlett-Packard HP9000 server in Albuquerque, N.M., which is geologically more stable. Using the frame-relay service, he will periodically send a copy of the company's central database from the home server in Santa Ana to this standby server; if anything happens in Santa Ana, he can then reassign the Albuquerque server to be the home server, thus preventing the network from coming down.

Collins believes the network investment was especially wise because it allows for future applications, particularly document imaging. When standards are in place and Plaza's business partners are capable of electronically transferring digitized pictures of mortgage documents rather then sending paper copies through the mail, the transfer protocol of choice will be asynchronous transfer mode (ATM), Collins says, which can be mounted rapidly on the hardware he's put in place.

Not every company has the option of replacing multiple heterogeneous networks with a single common platform. In organizations where departments have the freedom to choose their own LANs, the IT executive has to be both stockman and field boss of the enterprise network, satisfying users' genuine needs while disciplining their usage to conform to the limitations of the network. In this, standards—particularly for network operating systems—play a critical role.

"It's a question of managing flexibility," says Chris Serjak, consultant with Northeast Consulting Resources Inc. in Boston. Serjak says that the best way he's seen to get departments to adhere to standards set by IS is charging back costs to those using nonstandard technologies and protocols. Departments are not forbidden to use these technologies, but if they do they must pay out of their departmental IT budgets for any conversions or special equipment. For those that adhere to the standards, on the other hand, the service is free.

"It forces people to think about infrastructure," Serjak says.

PART OF MANAGING the various LANs that make up the enterprise network is recognizing and helping to facilitate their ability to reshape the work environment. The user pioneers in this area are physically at the edge, far away from corporate offices. They are the telecommuters, who, for all the hype and sociological theorizing about it, often love the technology for the most mundane reasons, such as being able to stay home with a sniffling child or crunch some numbers while quaffing their homemade cafe latte.

Link Resources, a New York research firm (owned by the same company as *CIO*), reported in June that the U.S. telecommuting workforce numbers 7.6 million, up 15 percent from last year. As more and more workers opt to follow that route, IT managers are increasingly being called upon to provide the means to make it possible.

There are two primary ways of enabling remote access. The traditional option—using dial-up lines—is becoming more attractive because of substantial advances in technology and telecommunications services. Faster, cheaper modems, better compression routines and broader availability of integrated services digital network (ISDN) services are all helping workers do their work from farther afield than ever. But using dial-up lines, telecommuters' PCs act as dumb terminals, emulating by "remote control" a computer that is on the LAN. Network managers, meanwhile, have no way of monitoring who is on the LAN.

With "remote node" access, on the

Network-Management Systems in Use: Once and Future

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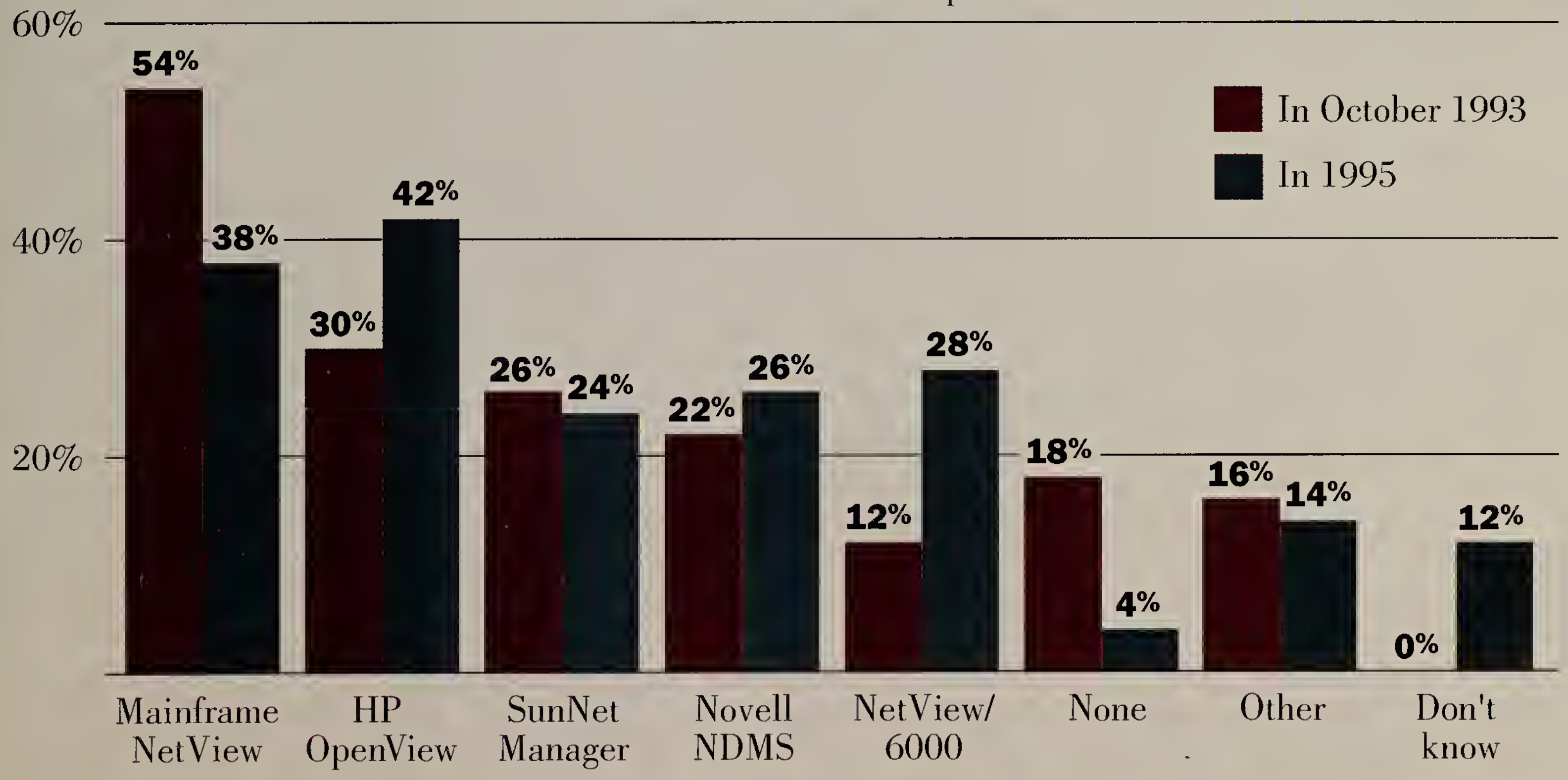

Source: Forrester Research, Inc.

other hand, users' PCs work as full-fledged clients on the LAN, giving them the full functionality of a network node. This also makes it easier for IS to manage remote resources, since remote PCs can be directly addressed as a working node on the LAN. As a result, many managers are increasingly opting for this method.

At ZymoGenetics, a Seattle-based biotechnology company whose parent—Novo Nordisk—produces about half the world's supply of insulin, some 200 scientists, technicians and researchers work from home some time during their work weeks. Scientists can dial in and monitor the production of the company's patented proteins, for example, and make adjustments to the process from their home terminals. Those modeling molecules, meanwhile, can begin the necessary number crunching remotely in the evening so that the bulk of the CPU-intensive calculations are complete when they arrive at the laboratory in the morning.

Ken Martig, network system administrator, says that the dial-up process telecommuters use is indifferent to their desktop technology—Macintosh, PC or Silicon Graphics Inc. workstation. All remote users link to the network by dialing in to a Xylogics Inc. eight-port MicroAnnex XL network access server; once they have access to the LAN, they also can tap all the Unix-derived research tools and the archival resources of the global Internet, as if they were working from their consoles in the lab. "From home, I can check [Internet] news groups, check different servers to try to find solutions to problems. Our researchers come and do the same thing from home and check on the latest articles and data on the Internet," Martig says.

IN ORDER TO MANAGE enterprise networks proactively, managers must define data-communications requirements well in advance. Adjusting the network down the road is much more expensive than building the right thing in the first place.

Overall enterprise bandwidth demand will always be growing, but demand by individual users will be increasingly varied, according to CIMI Corp., a Voorhees, N.J., networking consultancy. By the end of the decade, CIMI estimates, every user will require more than 25Mbps of dedicated bandwidth, much more than that currently provided by conventional LANs. This is forcing CIOs in industries where larger and larger file transfers are required to try to corral additional bandwidth; options for LANs include enhanced Ethernet, fiber distributed data interface (FDDI) and ATM, each of which has its own communications conventions and hardware demands.

But CIMI President Tom Nolle says bandwidth hunger shouldn't send CIOs willy-nilly plugging cards with these advanced technologies into the desktop machine of every user. Network-bandwidth requirements are directly related to the individual user's requirements, so some will require much more than others. "Elite" users who draw on lots of databases and use image manipulation and transfer—or, in the future, videoconferencing—will put greater stress on the network; they

Looking Forward

A new category of software is emerging to help managers in client/server environments plan their future networks and applications better

Mapping the computing environment, measuring its throughput capacity and planning applications were once blissfully simple. In the mainframe days, applications could be premounted—conveniently after business hours—and their demand on the system could be quickly assessed without disrupting it in any major way. Now that client/server has emerged as the dominant computing architecture, however, the network *is* the computer, and system capacity is directly related to network capacity. For that reason, planning the development of applications with an eye to overall network performance has become critical.

The market has responded with a new genre of software: network-planning and -simulation tools. These specialized packages allow network managers to visually map their LANs and WANs, design their networks, and compare various application-deployment scenarios and predict performance.

What's difficult is understanding the irregular dynamics of bandwidth demand under client/server. What has a lot of managers truly stumped is "predicting what is going to happen in the future as I migrate more applications to distributive processing," says Jeff Leopold, director of client/server research at the Yankee Group in Boston.

Leopold cites network-planning tools from Make Systems Inc. of Mountain View, Calif., and Scientific and Engineering Software Inc. (SES) of Austin, Texas, as examples that he finds particularly impressive. "What's interesting is they come into this from very different different directions. Make Systems grew up on the telecom side, and SES comes from the computing side....I really can't say which is better."

Such modeling and planning tools have become important because of three significant changes brought about by the proliferation of distributed-processing networks, Leopold says:

- Application partitioning, which allows application code to be spread

BILL NOWACKI: *The AMA's goal is to let affiliated groups use any of the resources at headquarters as if they were right there in the main office.*

PHOTO BY MARC BERLOW

are the best candidates for extra bandwidth. But most users will require much less throughput than is available even today through these advanced technologies, he says.

"There is going to be a growing discrepancy between what is required to service elite users" and what is adequate for the rank and file, Nolle says. Accordingly, for enterprises whose users have a wide variety of bandwidth demands, hub-based switching may be a wiser choice than shared media in LAN technologies, since it requires media and communications protocols to be connected directly to the individual users that require them. This eliminates the waiting time that would occur in a shared environment.

On the WAN side, the increase in network traffic doesn't necessarily mean that corporations will suddenly have to invest in scores of set-bandwidth leased lines to carry all this information across their WANs. Client/server computing architectures shuttle data in discrete packets or bursts of varying size and frequency; so rather than leasing lines, which companies must pay for no matter how much they use them, many are turning instead to more-flexible options in which they can pay only for the bandwidth they use.

Such "virtual networks" are made possible by communications services now being offered by many common carriers. Frame relay, for example, available from AT&T, MCI and Sprint, provides virtual circuit connections so transparent that applications act as if there's a physical connection between two points. It is flexible and useful for many networks that transfer only alphanumeric data. Switched multimegabit data services (SMDS) is another option. Structured for local telephone exchanges and often used as a WAN transport service for companies concentrated in a single metropolitan area, SMDS is also a text-only strategy that gives the user the feeling of being attached to a backbone LAN.

over many different networks;

- increased deployment of reusable code, creating an infrastructure of network services that will become the next generation of network applications; and
- accelerating migration of applications from host-based computing platforms to client/server systems.

"When you take those three trends together, you can see that every distributed application I bring online has a big impact on network utilization," Leopold says.

The utility of this emerging genre is not confined to tweaking performance, according to Jay Batson, senior analyst at Forrester Research Inc. in Cambridge, Mass. "There are going to be major shakeouts and changes in the kinds of telecom service you can buy. With such rapid change going on, you can play with different telecom options and save some money." *–P. Cassidy*

ST. MARY MEDICAL Center in Long Beach, Calif., sits at a bustling frontier crossroads of relentless change: Modern medicine is advancing at an accelerating pace, while government and society search for a way to make its fruits available to everyone. To make sure it can keep up—even though many of the changes on the way are still unknown—St. Mary in 1993 began revamping its LAN. According to CIO Dennis Kotecki, "Our [network] investment was more than stimulated by Hillary [Clinton] and this whole idea of health-care-information sharing."

Using this new LAN, the 556-bed hospital's patient-care, pharmacy and radiology departments and its laboratories, doctors and nurses are able to share information through a simple, common interface Kotecki's department designed using Microsoft Corp.'s Visual Basic. For example, a doctor waiting for critical laboratory test results no longer has to keep checking with the lab to see if they are available. As soon as they come in, the lab puts them online, where they may be viewed from the doctor's own terminal.

Kotecki had to plan for emerging medical-information technologies such as teleradiology, or the digitized transport of radiological images

RICK FETZER: *"What we're trying to do is provide better service to the customer."*

for interpretation by remote doctors; deploy a network that could accommodate the data demands of the hospital's point-of-care, clinical and financial systems; and reserve enough bandwidth to be able to adapt to the demands of off-site users yet to be tied in. He installed 27 Hughes LAN Systems Enterprise hubs, running enhanced Ethernet over a fiber backbone. The hubs provide a backbone capable of supporting ATM via the insertion of the necessary cards. This assembly gives the system an effective bandwidth of 10 megabits per port, Kotecki says, and so allows for future video-intensive applications that use ATM protocols. Kotecki chose fiber as the LAN medium for its superior carrying capacity, he says. That capacity will be tested soon: The hospital plans to bring more test data—such as radiological images—online.

St. Mary's has 30 on-campus physicians' offices linked to the LAN; in addition, three off-site physicians' associate groups within an eight-mile radius have been linked through 56Kbps dedicated lines. These three offices are linked as remote nodes, directly addressable—and manageable—as part of the LAN.

ONE WAY NETWORKING technologies are expanding the boundaries of enterprise networks is by increasing the number of links forged among aligned corporations that need to trade data or share the burdens of high-level computation.

The American Medical Association (AMA), for example, is in the early stages of WAN design. The goal is to allow affiliated groups to use any of the resources the AMA headquarters has available as if they were right there in the main office, according to Bill Nowacki, director of systems and programming at the AMA headquarters in Chicago.

As a federation of some 220 state and county medical associations, the AMA's data-communications needs are both complex and varied. Association members may need to tap specific data resources that the AMA has on its servers, for example. At the same time, the headquarters office may need to broadcast E-mail to members about important political events germane to the industry.

The association is already designing its client software to allow data access to anyone with the same software. Giving access to a new group for joint research, for instance, will be a matter of arranging ISDN service, updating some tables in the router, defining the IP addresses and installing the client software at the remote end. The result: an instant alliance.

Finally, in many CIOs' peripheral vision there have been some dust clouds on the horizon. Those are the roving bands of wireless users, some with cellular phones and some with beepers. Soon, however, they'll be assembling at IS's door, demanding network access through wireless dial-up technology and presenting a whole host of new challenges.

Rick Fetzer, MIS manger for North American Drager of Telford, Pa., isn't waiting for this wild bunch to get ahead of him. Fetzer is designing a wireless WAN for his company, which manufactures anesthesia and patient-monitoring equipment. "We want to have pilots going at the end of this year and full-blown deployment by the first quarter of 1995," he says.

The system will be a virtual national wireless WAN based on notebook computers installed in Drager's service vans. The wireless technology used will be either cellular phone or packet radio, Fetzer says. Ultimately, the mobile-computing network, which will be a virtual extension of the local network in Telford, will include up to 200 nodes operated by the service vans, the sales force and the franchised dealers. "What we're trying to do is provide better service to the customer and at the same time control our inventory, control our vans and minimize the duplication of trips," Fetzer explains.

And he doesn't shrink from the challenge. Indeed, Fetzer has embraced it as an adventure into taming that last frontier of enterprise networks: the wireless beyond.

Peter Cassidy is a national affairs and technology reporter working from Boston. He can be reached via E-mail at: pcassidy@world.std.com.

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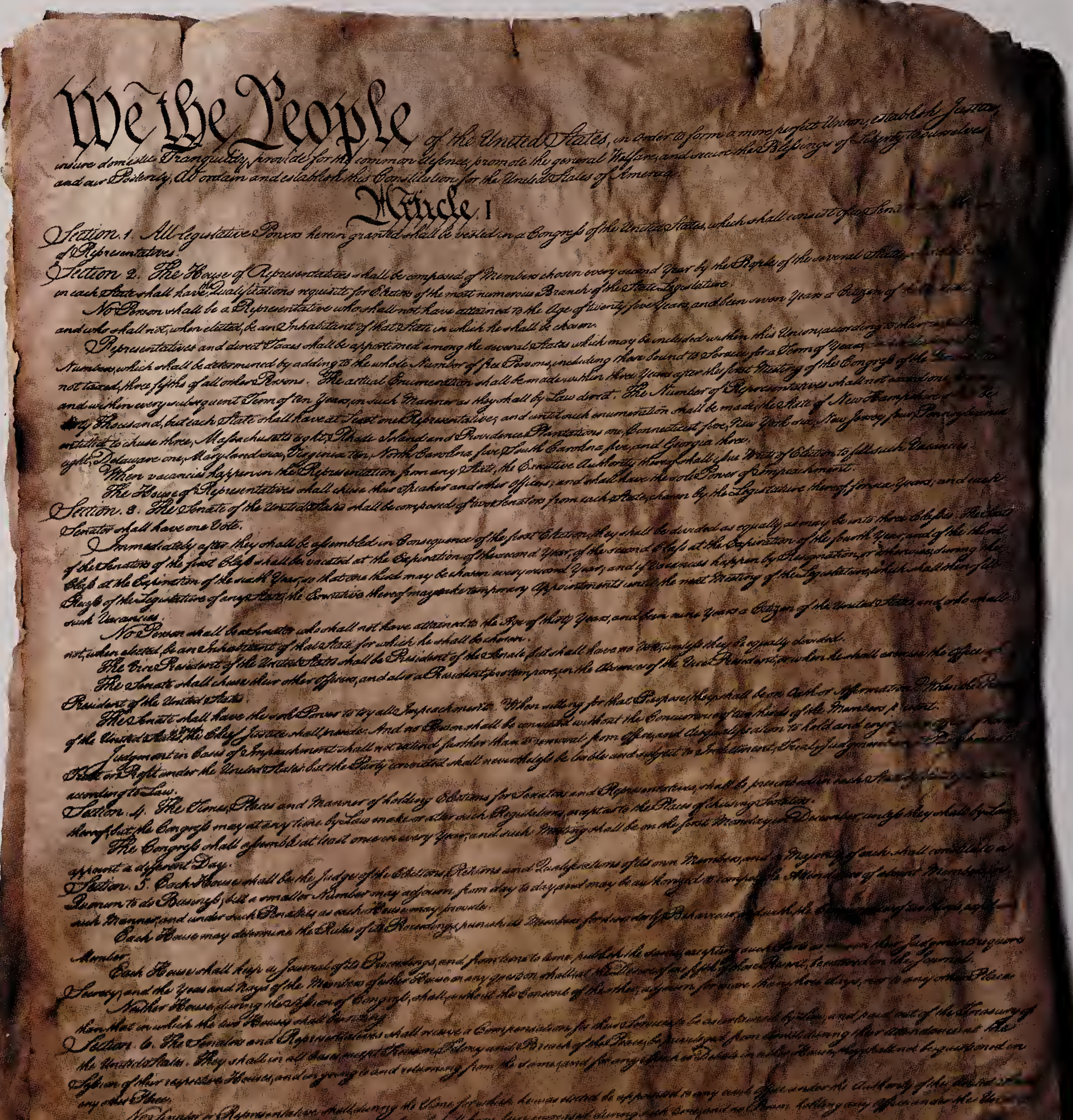

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THE QUEST FOR CORPORATE SMARTS

To quote Frederick the Great, it is "pardonable to be defeated but never to be surprised." Hoping to avert surprise, more and more businesses are devising programs of organized intelligence gathering and analysis.

BY E.B. BAATZ

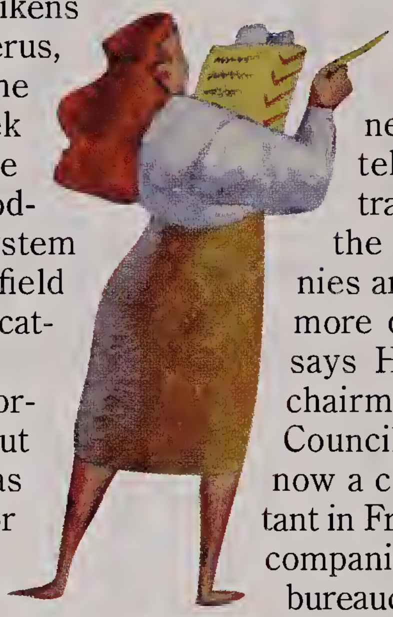
Welcome to the secretive but ubiquitous world of corporate intelligence. Defined most broadly, intelligence is the collection and analysis of information on markets, technologies, customers and competitors, as well as on socioeconomic and external political trends. It's secretive because "the more aware you become of the sources for information, the more vulnerable you realize your own company is," says Tatiana Gau, an intelligence security expert at The Parvus Co. in Silver Spring, Md. Yet it's ubiquitous because the potential sources are everywhere: your local library, online information ser-

The Competitive-Intelligence Quiz

If you answer "yes" to three or more of the questions below, then what are you waiting for?

- **Is your company competing in markets overseas?**
- **Have your product-development cycles been cut in half over the past few years?**
- **Do your employees waste a lot of time hunting down data?**
- **Do your employees know what internal "experts" they can call when they are doing a new project?**
- **Are managers making decisions based on anecdotal evidence even though there are hard numbers and detailed analysis available on somebody's computer?**
- **Are divisions in your company unaware that they are paying for multiple copies of the same research studies?**
- **Do you spend a lot of time in long meetings arguing about the numbers and the facts?**

vices, the new employee you just hired from the competition and the scuttlebutt at your industry's major trade show.



Professor Benjamin Gilad of Rutgers University in New Brunswick, N.J., likens competitive intelligence to Cerberus, the three-headed dog guarding the gates of the underworld in Greek mythology. Gilad classifies three distinct types of intelligence models: one, a passive monitoring system for early warning; two, tactical field support; and three, support dedicated to top-management strategy.

For example, by monitoring foreign mission reports, 3M found out that one of its key customers was building a refrigerator compressor plant in Lithuania six months before any newspaper reported it. At MassMutual, intelligence helps the field sales force keep track of the deals that competitors are offering on new life-insurance products. And at Southwestern Bell Telephone, war-gaming exercises prepare strategic planners for multiple contingencies in the fast-paced telecommunications industry.

As with any emerging management subject, the field is still hazy with indistinct buzzwords that are appropriated imprecisely by consultants and vendors alike, leaving the latest crop of competitive-intelligence practitioners and their information-systems implementers dazed and confused. "Competitor" intelligence focuses on analyzing competitors. "Business-intelligence" systems have been referred to narrowly as systems that support user access to central databases.

This can be a semantic sinkhole, but the important point is that some form of corporate intelligence will be a critical success factor in the knowledge-based economy of the 1990s; and CIOs can play a key role.

That role may take the CIO outside of traditional boundaries. "My experience is that the more we try to institutionalize competitive intelligence, the less we seem to accomplish," says David Drew, vice president of information technology for 3M in St. Paul, Minn. "In intelligence, it is more important to have the right people in the organization analyzing information than it is to have a system organizing information," he says.

In fact, 3M is acknowledged by intelligence experts to be one of the best of the big companies. "They are further along than most other companies because they are teaching people throughout the organization the value of information," says Leonard M. Fuld, an intelligence consultant from Cambridge, Mass.

Sheer size and muscle are not necessarily assets in corporate intelligence; in fact, quite the contrary. "I'd warn big companies that the small and medium-size companies are embracing intelligence much more quickly than the Fortune 500," says Herbert E. Meyer, former vice chairman of the National Intelligence Council under President Reagan and now a competitive-intelligence consultant in Friday Harbor, Wash. "In the larger companies, there are too many layers of bureaucrats. They're muscle-bound," he says.

Jan Herring, vice president for the business-intelligence practice at The Futures Group, a consulting company based in Glastonbury, Conn., agrees that small can be beautiful. "When the organization is small, the intelligence system is the president and the salespeople," says Herring. "They are constantly gathering information about the external environment to see if there is a threat or opportunity, talking to each other and acting on it." Once a company has more than 50 employees, says Herring, information gets lost and distorted as it moves through management layers.

Moreover, the stakes are rising quickly. A host of changes—the flattening of organizations, the greater emphasis on speed to market and rapid globalization—are fueling a growing demand for intelligence. At MassMutual, the fact that the product-development cycle has been cut in half heightens the need for intelligence in the once-staid insurance industry, says Peter Daboul, the company's senior vice president of information systems services. And with profit margins shrinking in many businesses, says Daboul, financial services is "not a gravy train anymore."

On the supply side, a sudden abundance of out-of-work operatives from the military and national-security intelligence communities, and the proliferation of data-bases, online services, new search software and workgroup communication tools all are signs that the stage is set for an intelligence fest.

Even CIOs who won't ultimately own their organizations' intelligence processes will

ILLUSTRATIONS BY KATE MUELLER

likely be called upon to provide more and better tools for more-sophisticated, demanding users. And some of the early intelligence programs that in recent years were sacrificed to the budget slashers are now being resuscitated. "In the 1980s, we put in the infrastructure on our mainframe to track competitors, then cost cuts came and competitive intelligence was axed," recalls Dan McNicholl, vice president of information systems at Whirlpool Corp. in St. Joseph, Mich. "Now, with the advent of major strategic changes in the company and the industry, everyone's clamoring for competitive intelligence again, and I want to provide the right systems to support it," he says.

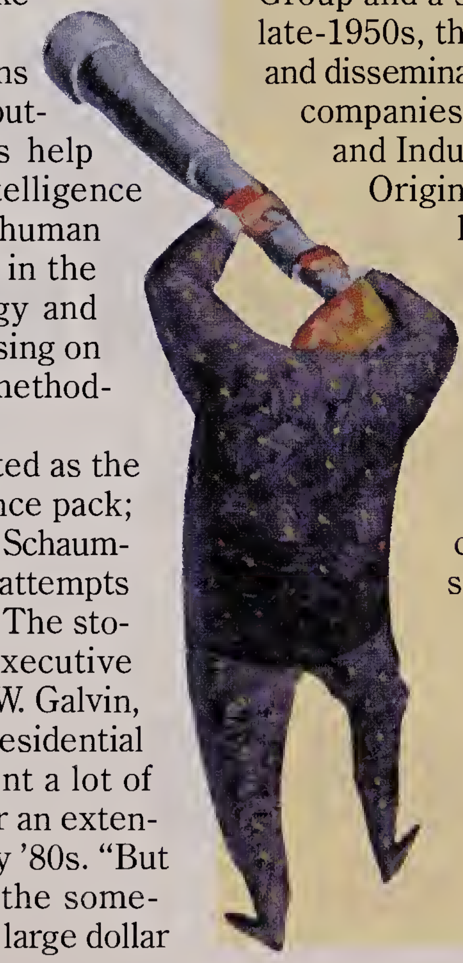
To enhance your company's chances for success in cracking the corporate intelligence code, here are seven key insights from the experts.

INFORMATION IS NOT INTELLIGENCE "Data, information and intelligence seem like interchangeable concepts," says Fuld. "But that's like saying you can use a kitchen knife to do brain surgery."

For example, data occurs when one person knows that your competitor had 100 employees last year and another person knows that it has 80 this year. Information evolves when the two people pool the data. Intelligence happens when you do the analysis, note the competitor has a tight fiscal policy, and decide that the company would make a good acquisition.

For the CIO, these distinctions are critical. Because, while computer and communication systems help tackle information flow, the intelligence function is essentially a sweaty, human function. "Intelligence happens in the intersection between technology and methodology," says Meyer. Focusing on technology to the detriment of methodology will end in failure, he says.

Motorola Inc. is most often cited as the leader of the business-intelligence pack; but it wasn't always that way. The Schaumburg, Ill., company made several attempts to get an intelligence unit going. The story has it that Chairman of the Executive Committee of the Board Robert W. Galvin, inspired by his service on the Presidential Foreign Intelligence Board, spent a lot of time and money putting together an extensive electronic library in the early '80s. "But it became difficult to reconcile the somewhat intangible benefits with the large dollar



The Stealth of Nations

In Japan and America, different attitudes toward intelligence activities arise from cultural roots

In Japan, one word—*joho*—means both information and intelligence; in this country, there remains a distinction between the terms, and perhaps even a cultural aversion to the latter. For its part, Japan has a long-standing tradition of gathering and using competitive information. A celebrated case from California a few years ago serves to illustrate the cultural divide:

An American family sued a Japanese automaker because of the conduct of one of its employees, who had been staying as a guest in the family's home. The employee was discovered snooping into the intimate details of his hosts' consumer purchases. Caught rummaging in their kitchen and bathroom cupboards, the visitor had apparently been compiling detailed reports on the family's tastes and habits and forwarding them to his bosses in Japan. To the American family, this invasion of their privacy grossly betrayed the rules of hospitality; but the automaker's employee, and his bosses, were ostensibly surprised that their activities provoked any strong objections. After all, they were endeavoring only to get as much customer information as possible so as to offer better products and services.

In fact, Japan's national business-support and intelligence organization springs from corporate roots. It was first developed by Mitsui Corp. and "rented" by the military when it came to power in World War II, says Jan Herring, vice president of The Futures Group and a student of the Japanese intelligence system. In the late-1950s, the government began sponsoring an effort to gather and disseminate information about Western technology to Japanese companies. Subsequently, the Ministry of International Trade and Industry set up the Japan External Trade Organization. Originally begun to promote trade, says Herring, JETRO has evolved into a huge competitive-intelligence body for business with 78 offices in over 60 countries, including seven in the United States. (U.S. companies can get JETRO reports too, but only after the reports have been pared down and translated.) With the opening of the Institute for Industrial Protection, a school avowedly established to train spies and counterspies for Japanese corporations, espionage reached a new pinnacle of respectability.

Ironically, the Japanese have been so successful at intelligence gathering that they now have an information-overload problem. Japanese businesspeople have begun attending meetings in America of the Society of Competitive Intelligence Professionals to get ideas about high-tech systems for organizing and extracting *joho*.

–E.B. Baatz

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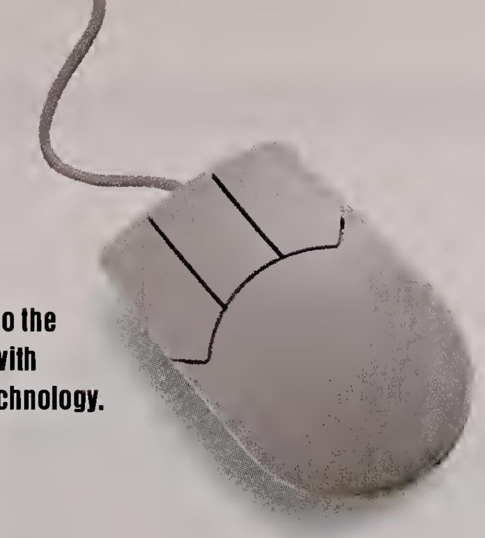

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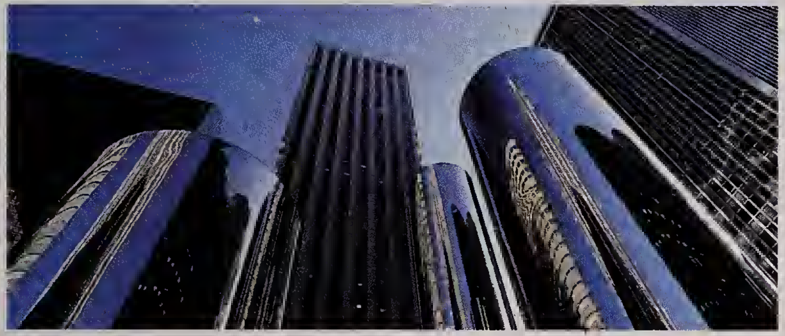

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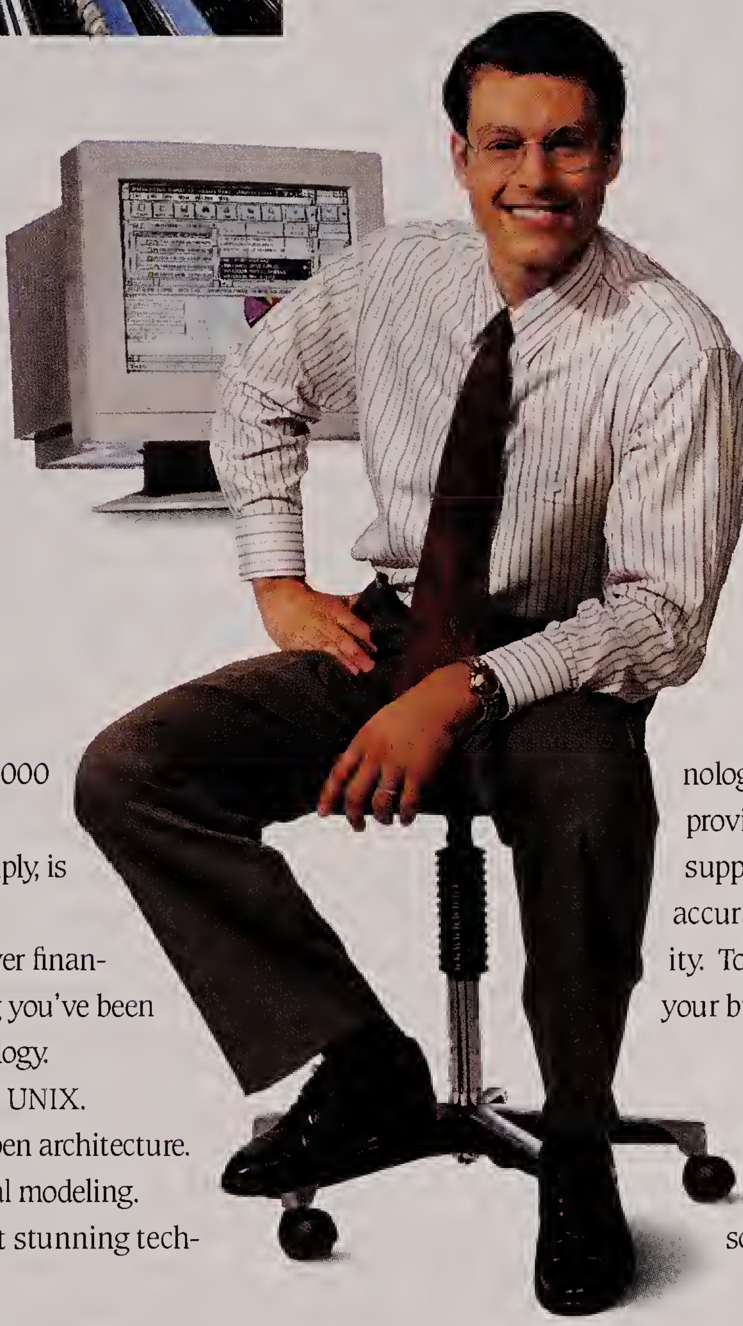

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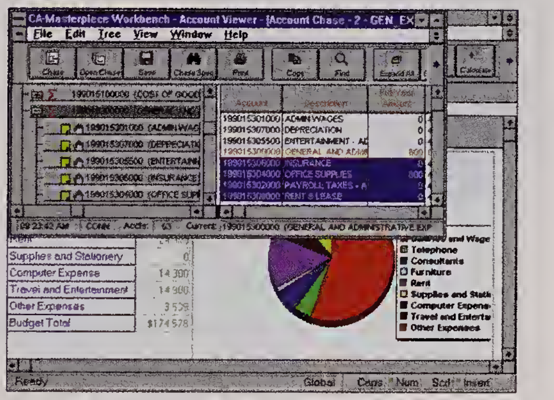
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> "*My experience is that the more we try to institutionalize competitive intelligence, the less we seem to accomplish.*"
>
> *–David Drew*

outlay needed to feed and maintain the system," says Fuld. In short, too much attention devoted to an information technology system can doom the intelligence system.

INTELLIGENCE SHOULD BE ACTION-DRIVEN
If the intelligence system doesn't get the right information to the right decision maker in a timely manner, then the system isn't working. Look again at Motorola. Herring, who now consults for The Futures Group, was the ex-CIA officer who helped Motorola set up a more-action-driven intelligence program in 1985. "It's important to note what intelligence is not at Motorola," Herring says. "It is not a library, not a collection of databases and not trying to serve everyone."

Motorola's intelligence group now reportedly works with concrete strategic goals in mind. For example, when the intelligence team found that Japanese manufacturers were shifting their budgets from manufacturing to research and development, Motorola acted by shifting a portion of its own R&D effort to Japan in order to participate in the new environment. Intelligence that is related to business goals becomes a lot easier to justify, says Herring.

The chairman's commitment to intelligence and the fact that the function is wedded with executive management's needs combine to make intelligence valuable for strategic planning at Motorola. (The intelligence unit is still active today at Motorola, although a spokeswoman for the company says the program has evolved considerably in the six years since Herring left. The unit, as a matter of protocol, refuses all interviews with the press.)

THE VACUUM-CLEANER APPROACH IS DOWN, IF NOT QUITE OUT While this is a corollary to the two intelligence insights cited above, it merits individual attention because of its vast implications for the task of creating technology tools to support an intelligence program.

"A lot of information systems are not oriented to provide the timely, accurate, reliable information that management needs," says John E. Prescott, professor of business administration at the University of Pittsburgh and former president of the Society of Competitive Intelligence Professionals. "We used to use the vacuum-cleaner approach, gathering everything anyone would want to know," says Prescott. But these undiscriminating systems delivered too much, and too general, information. "I am convinced now that competitive intelligence has evolved to the point where we want business systems that are tailored to specific needs and that help managers make better decisions on a project-by-project basis," he says.

Meyer's consulting business helps midsize companies avoid vacuum cleaning by first establishing an individualized intelligence profile for the company. Through a series of questions, Meyer sharpens the focus of the information-gathering process so that it yields intelligence that answers targeted business questions. "You have to point the radar in the right direction," says Meyer (whose successes include a sporting-goods manufacturer that caught the Japanese consumer trend to increased leisure before others did and a seed company that began using long-range weather forecasts to help with its sales forecasting).

While experts like Meyer may scorn the vacuum-cleaner approach, the vacuum cleaners are themselves becoming more sophisticated, more powerful and easier to use. The kinds of neural-net processing systems used by the Central Intelligence Agency are slowly migrating to the business community; but these systems are still difficult to use and require lots of training, according to Bonnie Hohhof, author of *Competitive Information Systems Development*, The Futures Group's book on building intelligence systems. "Still, I expect we'll see a lot of this becoming more commercially viable in the next five to eight years," predicts Hohhof.

RUTHLESSLY STAMP OUT INFORMATION DISTORTION Tom Peters calls information distortion "management enemy No. 1," and Robert E. Flynn, chairman and CEO of The NutraSweet Co., agrees. "This is like a religion to me.... Competitive intelligence must be a source of unfiltered, unbiased news. If I catch anyone biasing [the information], then a successor gets a crack at their job immediately," Flynn said last April at the annual convention of the Society of Competitive Intelligence Professionals.

Solutions to potential information distortions can be extremely simple, according to Fuld. For example, he advises companies to install a coding system that vets each piece of information on the network: a "one" has at least two supporting sources, a "two" has a single supporting source, and a "three" is a rumor. "This speeds information flow and allows people who are doing the analysis to separate the wheat from the chaff," says Fuld.

Be aware that corporate intelligence can upset the political apple cart. Flynn, for example, asserts that intelligence can expose a manager's successes as deriving from dumb luck, rather than from any special management talent. Naturally, this risk of exposure causes lots of sweaty palms among managers who might feel the temptation to distort information in their favor.

But Flynn's commitment to unvarnished intelligence apparently pays off. Although the Deerfield, Ill., company declines to reveal details, Flynn figures the NutraSweet intelligence program adds $50 million to the bottom line. The speed with which bad news travels to the top may indeed have something to do with this success.

MONEY HELPS, BUT SUPPORT MUST GO DEEPER MassMutual is a relative newcomer to the practice of systemized intelligence, but not to the realization that top corporate support and employee buy-in mean more than money. The mandate for competitive intelligence arose in 1988 with the arrival of a new CEO, Thomas B. Wheeler, at the Springfield, Mass.-based company. The corporate-strategy department undertook the task. Richard M. Dooley, a young manager with no previous competitive-intelligence background, was transferred to get the ball rolling. After attending a two-day seminar, Dooley and another employee began the arduous process of gathering, sifting, analyzing and disseminating competitor information to corporate management for strategic planning.

In 1992, agreeing with the internal systems department that buying an outside system to automate the information-collection and -dissemination function made the most sense, Dooley examined the two or three vendors available at the time. After settling on Quest Management Systems' Incite program, he began a door-to-door sales job, gathering $15,000 from the strategic planning department and $5,000 each from three departments within the largest line of business. "Getting funding from all the prospective users has been critical to the program's success," says Dooley.

Once Dooley had the money and got the system up and running, he was able to jumpstart participation in the intelligence pro-

Intelligence Resources For CIOs

"Strategic Issues Management: A Comprehensive Guide to Environmental Scanning," *by John D. Stoffels (Pergamon Press and The Planning Forum, 1993); a framework for designing and managing a system to capture strategically valuable signals of change. To order: 513 523-4125.*

"Real-World Intelligence," *by Herbert E. Meyer (Storm King Press, 1991; Weidenfield & Nicolson, 1987); an overview of competitive intelligence for the senior-executive audience by an ex-CIA official. Meyer also runs a company, based in Friday Harbor, Wash., that designs and builds customized intelligence systems. To contact: 206 378-3908.*

"Competitive Information Systems Development, The Business Intelligence System: A New Tool for Competitive Advantage," *by Ben and Tamar Gilad (AMACOM-American Management Association, 1988), looks at competitive intelligence from the management viewpoint of a Rutgers University professor. To order: 800 262-9699.*

"The New Competitor Intelligence," *by Leonard M. Fuld (John Wiley & Sons, 1995), the latest tome from the intelligence community's most prolific writer, is due out in January. The book includes chapters on international intelligence and many case studies. Fuld also runs seminars on setting up corporate intelligence programs and undertakes specific intelligence projects as well. To contact: 617 492-5900.*

Other books: "Business Blindspots," *by Ben Gilad (Probus Publishing, 1994);* **"Competitor Intelligence Manual and Guide,"** *by Kirk Tyson (Prentice Hall, 1990);* **"Business Competitor Intelligence,"** *by William Sammon (John Wiley & Sons, 1984).*

The Parvus Co. *in Silver Spring, Md., run by Gerard Burke, former executive director for President Nixon's Foreign Intelligence Advisory Board, specializes in protecting companies from industrial espionage. To contact: 301 589-4949. The managing director of Parvus is Tatiana Gau.*

The Society of Competitive Intelligence Professionals *has 2,200 members who practice competitive intelligence in a variety of industries including telecommunications, pharmaceuticals, computers and chemicals. The group has an annual conference in the spring and publishes a quarterly review. To contact: 703 739-0696.*

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> *"You don't need to pay a lot of money to get this to work. You simply need to pay a lot of attention."*
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> *–Leonard M. Fuld*

gram, growing from 10 to 140 users in a single year. He expects to have nearly 300 users of the system by the end of this year.

"You don't need to pay a lot of money to get this to work," says Fuld. "You simply need to pay a lot of attention."

INTELLIGENCE IS AN ORGANIC PROCESS Experts say it takes at least three years before a fledgling intelligence unit is firmly established. And even once established, its shape should remain perpetually flexible. Southwestern Bell Telephone in St. Louis illustrates that a healthy intelligence program is always changing. Since the regional Bell operating company's corporate competitive-intelligence group was formed in 1989, the unit has evolved constantly—including a complete change in personnel.

Initially, the intelligence function was centralized, with one data collector and one analyst each dedicated to a separate functional area (marketing, technology, finance, government regulations). When this scheme failed to yield actionable results, the team reorganized by merging the collector and analyst roles and refocusing on such key telecommunications technologies as wireless, cable telephony and the like.

Getting information to flow from the sales and line staff to the central intelligence unit was the biggest challenge, according to Karen Wolters, a Southwestern Bell product-development manager who was a member of the original intelligence team. Employees were so busy doing their jobs that it was difficult to get them to take an extra 15 minutes a day to do a core dump of knowledge gleaned from the day's meetings and phone conversations.

In transformation No. 3, veteran members of the group (including Wolters) are moving into line and other staff assignments, helping to propagate the intelligence ethos throughout the organization.

Every company's intelligence program is unique, but one common denominator remains. Competitive intelligence must be able to mutate in order to remain sensitive to shifts in the environment and the business organization.

COUNTERINTELLIGENCE COUNTS, TOO Business demand for counterintelligence expertise seems to be growing as more and more companies become enlightened about the value of their own—and others'—information. It's easy to hyperventilate about possible security threats. "Anyone traveling or communicating overseas should be aware that faxes, phone calls and E-mail are routinely intercepted," says William DeGenaro, former director of strategic countermeasures planning for the Defense Department and now a Futures Group director. In speeches he gives to the business community, DeGenaro cites a ring of thieves that makes about $10,000 for every laptop computer it steals. "They're making far more than the laptop is worth because they're milking the hard disk and shopping the information," says DeGenaro.

But don't mistake the ethical and legal competitive-intelligence practice for the unethical and often illegal game of industrial espionage. Competitive-intelligence professionals are adamant that they don't cross the line that separates "above board" from "below the belt." Indeed, the unsavory associations of the word "intelligence" lead many companies to avoid the terminology altogether (and also to avoid being interviewed for stories like this one). Besides, it is commonly held that 90 percent of the information a company needs for effective strategizing is publicly available. Moreover, say experts, at least 70 percent of the information that management needs resides with employees themselves.

When all is said and done, a black-and-white, straightforward view of information and intelligence systems may simply not be possible. "In the real world," writes Stuart Macdonald, a professor and information theorist from the University of Warwick in Coventry, England, "there is no clear distinction between industrial espionage and other informal means of communication."

With that ambiguity in mind, you have indeed entered the shady, gray, mysterious world of competitive intelligence. CIO

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Searcher Serfs

Intelligent agents, a new breed of search-and-retrieval tool, will help users find the data they want from the sea of data available online

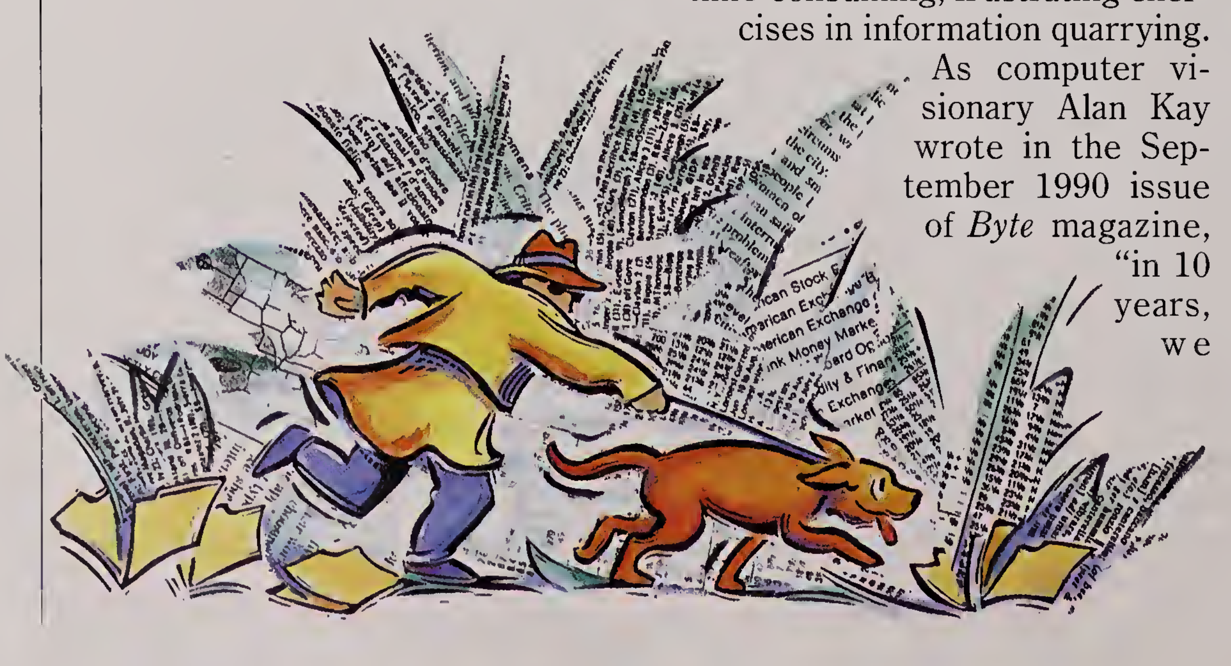
BY JOHN EDWARDS

Running standard software, the PC is a fast but not exceptionally brilliant data-retrieval tool. Tell it to search an online database for magazine articles relating to the evolution of chips and you'll almost certainly get material describing Doritos, Ruffles and that kid in *My Three Sons* mixed in with the desired information on DRAMs, ASICs and 486 clones.

Even when a search has been carefully tailored to use precise key words, Boolean methods and other querying tools, the results can be less than satisfactory. All too often, unable to tell the difference between useful facts and worthless minutiae, the program will return so much material that the user is overwhelmed. As a result, the technology that was supposed to help the user learn more about a particular subject area turns into a nemesis that suffocates the individual with more material than is humanly possible to absorb.

With more newspapers, magazines, research companies and other information providers bringing their work online, the situation is becoming increasingly grim. If current trends continue, even the simplest data searches will soon turn into time-consuming, frustrating exercises in information quarrying.

As computer visionary Alan Kay wrote in the September 1990 issue of *Byte* magazine, "in 10 years, we will be hooked up to more than a trillion objects of useful knowledge, and no direct manipulation interface can handle that. People are not going to sit down with a super SQL application and start fishing around the entire world for things that might be of use to them."



Most technology planners believe that the only way business professionals will be able to keep afloat in this sea of computer-delivered information is with the help of "intelligent agents"—self-contained miniprograms that scour online databases and other resources at their users' behest for key bits of information. Agents work in background mode, silently seeking out information for presentation to their users in an organized form. The technology is designed to help users find the material they need quickly and efficiently, without constructing elaborate structures for search and retrieval.

The intelligent-agent concept has been kicking around for several decades. The term was coined in the 1960s by Oliver Selfridge, then a researcher at MIT. Hewlett-Packard Co. made the industry's first big investment in agents in the late 1980s when it decided to include a rudimentary version of the technology in its NewWave operating environment. The field then languished for several years, but it has recently gained new momentum with the arrival of powerful, multitasking desktop computers, handheld personal digital assistants and enriched databases. Today, with groupware products linking users to electronic information resources—and each other—in ever-growing numbers, a wide range of vendors are exploring the technology's potential once again.

One of the most active proponents of agents is General Magic Inc., a Mountain View, Calif., startup backed

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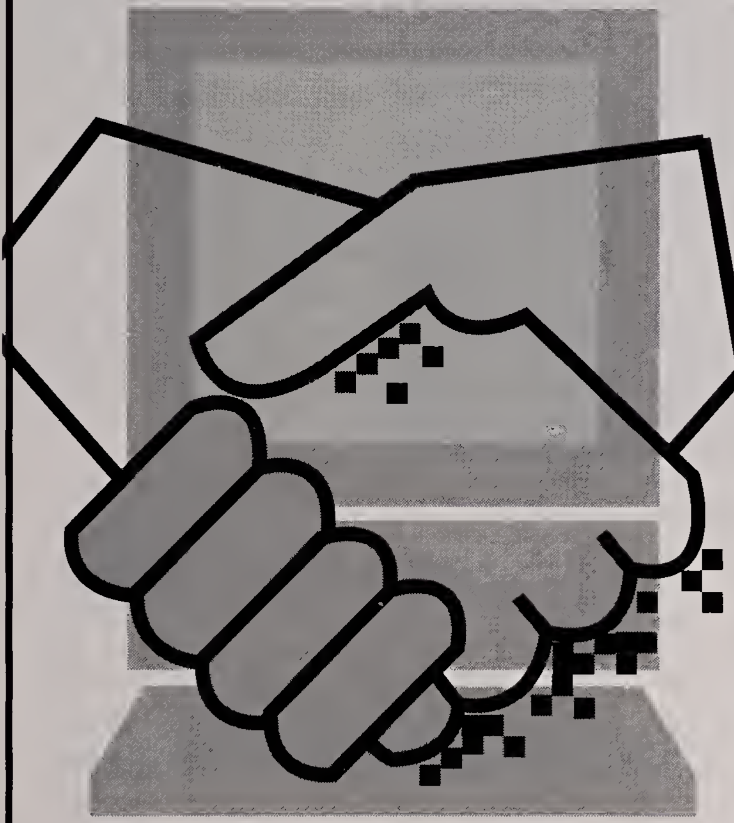

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by AT&T, Apple Computer Inc. and several other major investors. General Magic's Telescript language is used by developers to create mobile agents that can be dispatched into cyberspace from a portable or desktop system to search out and retrieve information from online services, corporate databases and numerous other sources.

Agents can be divided into two general categories: nonmobile and mobile, according to Jim White, General Magic's vice president of communication engineering. A nonmobile agent resides in a single computer from which it can access a specific database and search it for information that meets its user's needs. A mobile agent, says White, "goes out into a large information network and navigates through it, visiting various places in the network to do various things." By means of mobile agents, an application can distribute itself among the network's computers so as to use the servers more effectively.

Within the nonmobile and mobile categories can be found both "searching" and "watching" agents, says White. A searching agent looks for material that already exists inside a database, while a watching agent continuously monitors an information source, such as the Dow Jones News Service, to pick up information as it arrives. Mobile agents are able to perform such tasks even in the user's absence. "The type of agent you need at any particular moment depends on the sort of task that you want to accomplish," he says. Searching agents are most useful for one-time projects, such as the development of a presentation or report, while watching agents keep their users up-to-date on ongoing events.

Yet another type of agent, called an "orchestrator," is moving onto the scene. Orchestrator agents combine various activities to perform a series of complicated tasks, according to White. Though not yet generally available, orchestrator agents could be used to search for the best price on a consumer product, to uncover the most convenient and least expensive airline flight between two cities or to build a personalized daily newspaper by drawing information from numerous online resources. "Any of these tasks will take several stages to complete," says White; an agent that could accomplish them all would have to be extremely sophisticated and flexible.

Companies like Banyan Systems Inc. of Westboro, Mass., Charles River Analytics Inc. of Cambridge, Mass., and SandPoint Co., also of Cambridge, are incorporating agent technology into products that sort out information for networked computer users. SandPoint's Hoover software works with Lotus Notes, using the groupware product as a graphical front end. Hoover searches out and returns news, research information and other material from real-time news feeds, online databases, CD-ROMs and internal corporate databases. Hoover users check off items on a list describing the types of information they need. Search results are delivered by Hoover to the user in the appropriate Notes databases, where the material can be read, edited or directly incorporated with other Notes documents into a business application.

> **"We're constantly struggling with the question of how do you make it simple enough for people to program these agents and yet at the same time give them the sophisticated results that they expect?"**
>
> *–Tom Henry*

Hoover's advanced technology comes at an equally advanced price. The monthly fee is $233 per user or a one-time payment of $77,000 for a 100-user license. It is not, therefore, the sort of product most organizations would bestow on a junior clerk.

Tom Henry, SandPoint's vice president of product creation and marketing, notes that agent developers must carefully balance the interests of users, who typically want no-brainer, easy-to-program agents, against the demands of the complex environments in which the programs work. "We're constantly struggling with the question of how do you make it simple enough for people to program these agents and yet at the same time give them the sophisticated results that they expect?" Henry says SandPoint deals with the dilemma by building into Hoover preprogrammed agents that require only minimal user input, such as clicking on icons and checking off list choices.

But Neal M. Goldsmith, publisher of *Business Technology*, a technology-strategy newsletter in New York, says off-the-shelf agents simply aren't powerful or flexible enough to help busy business professionals keep their heads above the surging information flow. "What we need are systems that are intelligent, not just in the simple, rudimentary way of knowing how to log on and navigate through a system but intelligent in actually acting upon the information gathered before presenting it," he says.

An agent can't really meet its user's needs without first knowing something about the user, Goldsmith believes. A truly useful agent, like a competent human assistant, should be able to accommodate its boss's demands. "What we need now are tools that can extract relevant points and present decision options," he says. Next-generation agents will be able to observe their users' behavior and predict their desires. "They will be like the almost-extinct executive secretary, someone who anticipates your needs and knows you better than you know yourself."

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perience an embryonic form of such technology with an application called Open Sesame! that sells for well under $100. The software, created by Charles River Analytics, monitors its user's keyboard and pointing-device habits and learns by observing recurring patterns. For instance, if the program notices that its user routinely checks for pending E-mail at 8 a.m., it will automatically alert the individual at that time each day with the onscreen message: "I notice you check your E-mail every day at 8 a.m. Would you like me to automate this task?"

Although it can't learn by observing, Banyan Systems' BeyondMail can be taught to automate responses to incoming electronic mail. For example, a user might instruct the program to, in effect, "send the latest study on widgets if I receive a message from Stan Doaks" or "E-mail U.S. prices only to product inquiries received from U.S. clients." The software is currently available in DOS and Windows versions at prices starting at $695 for a standard-edition 10-user pack and $995 for a 10-user professional edition.

Tom Mitchell, a computer-science professor at Pittsburgh's Carnegie Mellon University, has developed a prototype agent-oriented scheduling application that keeps track of the quirks and interests of its user. Called Calendar Apprentice, "it's really an experiment in the techniques for building personal software agents that will automatically customize themselves to their individual users," says Mitchell. If used by a professor, for example, the software might note that meetings with students about their grades typically last half an hour. Mitchell hopes the software will eventually lead to more-sophisticated applications that represent the user much like a secretary who knows his or her boss's habits and idiosyncrasies.

While agent technology is gradually gaining power, there are still strict limits to even the most sophisticated agent's reasoning abilities. "The problem with software agents is that they don't have eyes and ears like people, so they're limited in what they can observe," says Mitchell. A boss may ask her human secretary to see if the conference room down the hall is available; making the same request of an agent will likely result in nothing more than an electronic question mark, since that information usually can't be found online.

Mitchell believes that future agents will be able to increase their observational powers by working in consort with other agents. By interrogating agents located at strategic points in both local and wide area networks, the program will be able to find, and perhaps even schedule a meeting with, a person it wasn't originally aware of. As a result, users will be able to launch searches with criteria as skimpy as a person's name, company and city, or perhaps even on something as vague as "that fellow at Acme Corp. who's in charge of widget procurement." The idea is that one agent will help another until the specific person is found in a particular database or directory. The same technique could be applied to finding scarce automobile parts, locating the source of an obscure literary passage or uncovering the number of tomatoes grown yearly in Venezuela.

Over the long term, SandPoint's Tom Henry expects agents to gain multimedia capabilities, allowing users to retrieve segments of sound and video as well as text. "What we need to get are some standards for identifying significant events..., so when a video track is getting laid down, there's a way of tagging or coding the subject content," he says. But Henry doesn't believe that the arrival of such technology is imminent. "Most corporate networks can't handle multimedia, so the business need just isn't there yet."

John Edwards is a freelance writer based in Mt. Laurel, N.J.

Field Agents

Although intelligent agents have a variety of current and projected applications, experts say the following fields seem to have the most immediate potential:

Electronic mail: Agents can query other network users, automatically retrieve and send information, schedule meetings, solicit input on specific topics and pursue a wide range of other matters. Agents can also keep track and advise users of the correspondent's habits and preferences.

Research: Agents can search multiple databases, scanning for material that matches the user's needs.

News: Agents can be dispatched to monitor several different news services. "Personal newspapers" can be automatically created on a daily, hourly or even a minute-to-minute basis to reflect the user's particular interests.

Travel: Agents can be sent into travel databases to search for the lowest air fares, the best hotel-room rates and the most suitable ground-transportation alternatives. The programs will be able to alert the travel vendor to specific prerequisites, such as a special dietary need or the preference for a two-door rather than a four-door car.

Shopping: As soon as manufacturers, wholesalers and retailers begin moving online in force, agents will be able to navigate among vendors, scouting out the best prices, delivery times, warranty polices and other key information. The user may even authorize the agent to conclude the deal electronically without human intervention. *–J. Edwards*

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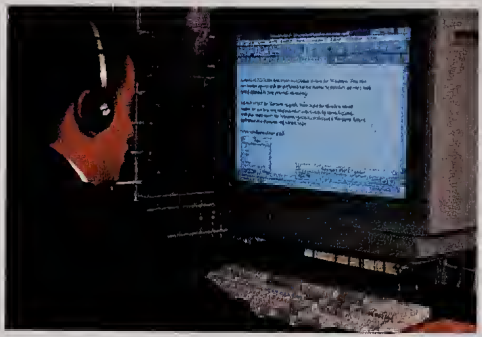
Kurzweil Applied Intelligence Inc.'s product enables professionals to run Windows and Windows-based applications by voice. Depending on the system's memory, Voice for Windows provides either a 60,000-word or a 30,000-word active vocabulary, including predefined and business-specific words added by the user. It also features a 200,000-word dictionary. Because the system is based on speaker-independent, discrete speech-recognition technology, users can begin using it immediately, without training the system to understand their voices. It has a nearly 95 percent accuracy rate, according to Kurzweil.



Voice for Windows can be used to run WordPerfect Corp.'s WordPerfect, InForms, Presentations and Office; Lotus Development Corp.'s 1-2-3, Improv, Ami Pro, Approach, cc:Mail and Notes; and Microsoft Corp.'s Windows 3.1 or higher, Word, Access, Excel, PowerPoint, Mail and Forms Designer, among others.

The product requires a 486 DX/33 PC or higher, with either 8 or 16MB of memory and 30MB of hard-disk space; a VGA or higher-resolution video adapter; and Windows 3.1 or a later version. The price, including a DSP-based sound board and microphone, is $995. For information, call 617 893-5151.

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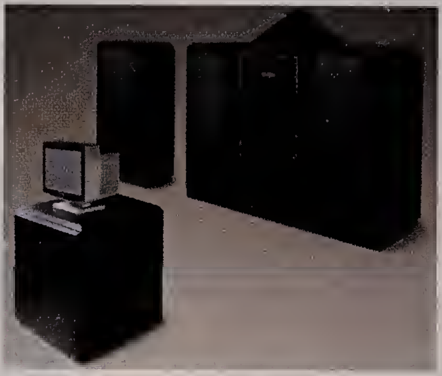

Companies today demand more-reliable information with immediate availability—without paying a premium. Amdahl Corp.'s Xplorer 2000 Series of massively parallel database servers is designed to answer the needs of corporations—such as retail and insurance firms—that analyze massive amounts of data.

The products of an alliance among Amdahl, Oracle Corp., nCUBE and Information Builders Inc. (IBI), the two Xplorer models include the latest version of Oracle's namesake relational-database software and IBI's EDA/SQL software. The Model 50 can be configured with 32 to 64 processor nodes and 10 to 80GB of disk storage. The Model 100's capacity ranges from 64 to 512 processor nodes and 48 to 1,176GB of storage. The servers are scheduled to be available in the fourth quarter. Amdahl officials estimate an entry-level system will cost significantly less than $1 million. For more information, call 408 746-6000.

Getting the Message

Companies that lend an ear to their customers just might find a new opportunity. That's the case at Lotus Development Corp.'s Inter-Enterprise Communications Group division (formerly SoftSwitch Inc.), a supplier of backbone messaging products in Wayne, Pa. The company has responded to frequent customer requests for value-added services by establishing a partnership program with vendors. The idea, says Director of Marketing Betsy Chapman, is to provide customers with a single source of expertise by joining forces with vendors that offer complementary products and services.

The first partnership agreement was formed with Neoteric Inc., a New York-based systems integrator and reseller of multivendor messaging and workflow systems. "Neoteric will provide additional installation and setup services that we don't do," says Chapman. For example, Lotus might install a backbone for a customer, while Neoteric takes care of the network file server and programming. Both firms are held to certain performance standards and have made a commitment to train employees on each other's product lines.

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meet its requirements—nothing else could possibly work.

I looked up the history of the Acme project (a major rewrite and conversion of all the systems that support the business). At least three separate proposals had been developed over the past 18 months. Each of the proposals was significantly different from the others (one, in fact, proposed that the unit remain within the data center). Yet, each was presented (after unspecified alternatives were summed up as inadequate) as the *only* solution that could meet the users' requirements.

I've witnessed this syndrome before. Predictably, the more questions I asked, the more resistant Acme personnel became to this "interference from Corporate." I learned as well that one of my predecessors had "strongly recommended" a particular vendor's box (accounting for one of the three earlier proposals), which happened not to be the box the unit wanted. This had something to do with Acme's aversion to any further "help" from Corporate.

Taken together, the vendor viability issues and the risks associated with the untried technology itself finally convinced Acme's general management to ask tech staff to go after a different solution. That was good. But we had stuck our thumb in the eye of Acme's technical manager. That was not so good.

The next proposal had some of the same characteristics that had been troubling about its predecessors: Only one vendor could meet requirements, the box was still in beta, and the price was a "special deal" that would evaporate unless we bought quickly. I guess the logical interpretation of this proposal was that if the vendor hadn't invented its brand-new rig in the nick of time, we wouldn't have been able to continue operations. Never before had I seen a herd of customers so quickly and credulously align themselves with a vendor's salespeople. It seemed possible this was a case of "love the one you're with"—whereby the vendor most recently encountered becomes the one whose solution can't be lived without.

Beware the potentially terrible consequences of unequally effective vendor sales teams. Unless your procurement process is rigorous, a strong sales team can prevail with a weaker technology solution over a superior solution fronted by a weaker sales team. I think we have to train our people to look beyond the skills of the sales team.

No matter how hard I emphasized that we wanted only to ensure a rigorous process, I inadvertently polarized Acme against Corporate.

I was trying to instill across our business units the adoption of a balanced and thorough process that betrayed no bias toward any particular vendor or technology. I don't really think it makes all that much difference anymore whose box you buy—so many of them differ only at the margins. The important point is to get the business benefits of competition among prospective suppliers and of a thorough, professional analysis of the best available options.

But all politics are local, so we naturally got pretty entangled in the thicket of Corporate (we, the Death Star) versus business-unit autonomy (they, the virtuous rebels). While we insisted on a competitive evaluation and a runoff of at least three vendors, they executed a fast shuffle of the benchmark criteria. In the end, we never did get the numbers right (for example, the stated number of users the new system was specified to support exceeded Acme's payroll).

Our insistence on rigor quickly reached a point of diminishing returns. Acme was far away; it had more people counting things than we did; and, after all, it was Acme's business. Who were we to tell it what its requirements were?

One of the most frustrating aspects of this brouhaha was that Acme's technical team was both good and dedicated. But since it was used to operating in the shelter of a data center, it was skilled in the application but not in the underlying technology. There is quite a difference between competency in application development and the ability to select and operate a system.

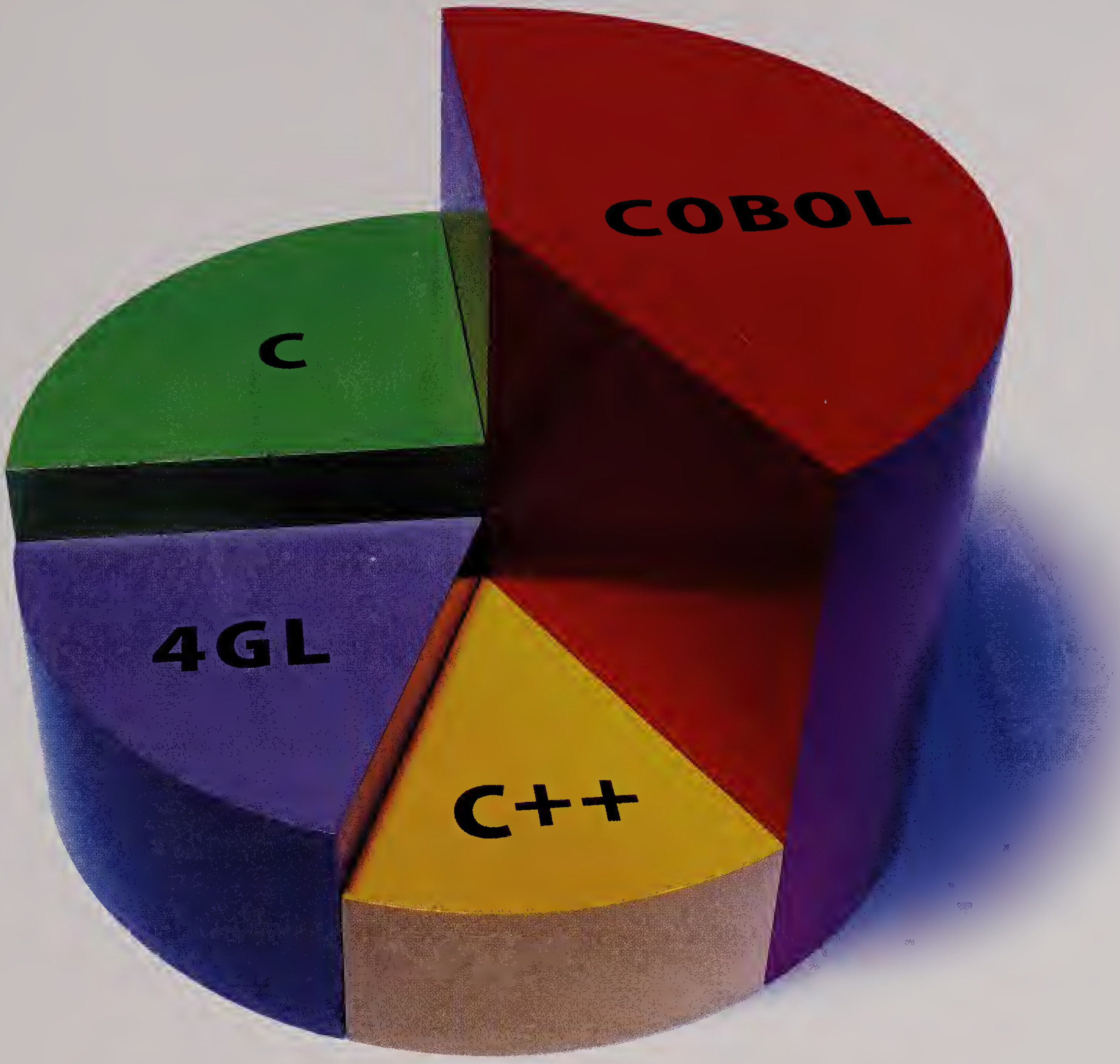
No matter how hard I emphasized that we wanted only to ensure a rigorous process, I had inadvertently polarized Acme against Corporate. Our COO, not exactly a technical wizard, believed strongly in business-unit autonomy; so Acme prevailed, and we wound up looking like we were interfering a bit too much.

Ah, but there's more. Just a few days ago, Acme waltzed in with an update: The "strategic" feature that had been the critical factor in selecting the chosen system apparently turned out not to be quite so critical to the vendor—it abandoned the system in favor of a less proprietary design. Ahem.... Thus, the basis for Acme's advocacy of this particular solution had suddenly become irrelevant. And, oh, by the way: The design shift was going to mean the box would cost a few bucks more (measured in the tens of thousands). All this was, of course, conveyed with perfectly straight faces.

Unfortunately, none of the relevant general managers had the time or inclination to understand what had happened here (and neither the logic nor the technology issues leap out easily to the uninitiated).

All in all, not a stellar performance for our profession. Sometimes our inability to see past technology to basic business analysis does us in. Maybe that's why we sometimes wonder whether we have "real" jobs—equivalent to those of the grown-ups in finance, marketing and manufacturing. Maybe not. CIO

W.F. Dyle is the pseudonym of a working CIO whose observations appear regularly in CIO Confidential.



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A Case of Rigor Mortis

Intuition says a rigorous technology-procurement process is a good thing, but trying to impose one where it's not wanted can be hazardous to your health

BY W. F. DYLE

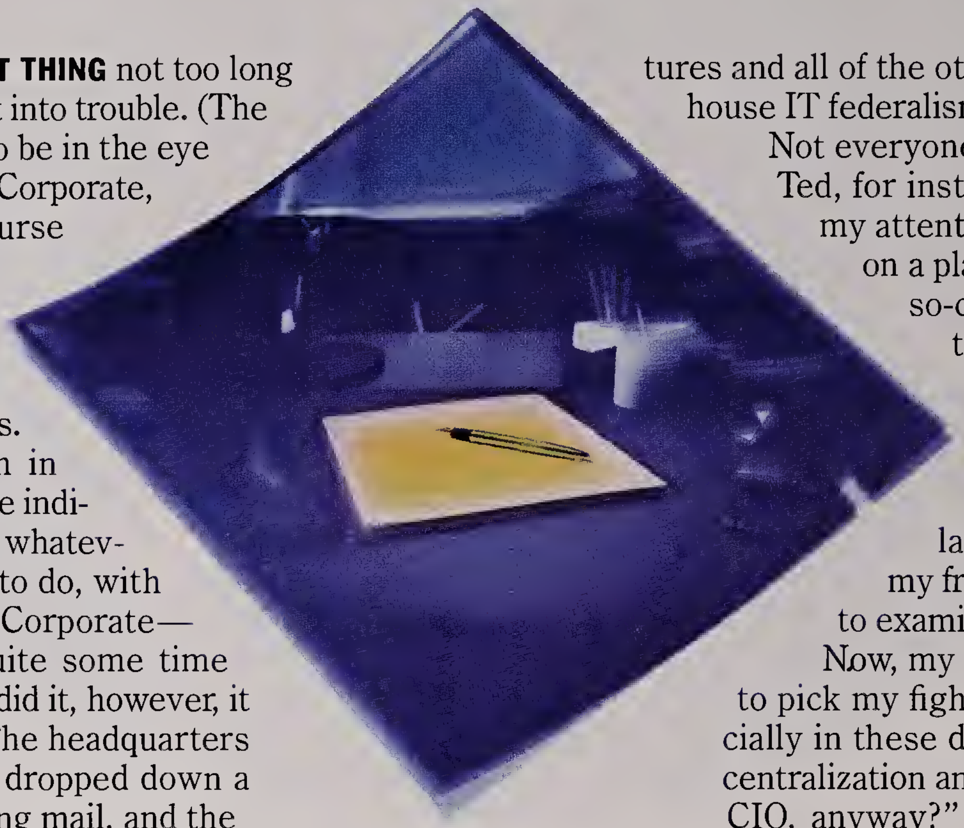

PHOTO BY JOHN RAE

I WAS DOING THE RIGHT THING not too long ago, so naturally I got into trouble. (The "right thing" tends to be in the eye of the beholder.) I'm Corporate, which means of course that I'm "here to help," so I get to review any big expenditures for technology in our decentralized business units. Decentralization—which in our case means letting the individual operating units do whatever they think they need to do, with little interference from Corporate—has been a trend for quite some time now. When my company did it, however, it was an abrupt change: The headquarters people were summarily dropped down a windy chute, like outgoing mail, and the businesses were set free. Naturally, this stirring emancipation decree was issued well before (say, about three or four years before) any of the units had the staff, experience or expertise with which to make intelligent decisions.

Shrewdly, however, the chairman recognized that there had to be at least *some* central group that could still devote a minimal amount of attention to any corporate goals that lay outside the various units' provincial objectives. That task fell, at least in part, to me. Of course, the financial community still has significant financial control over large capital expenditures. (It seems the finance function is often last to be decentralized—and sometimes not at all.) Our finance folks are bright and pragmatic, so we usually collaborate on capital items, giving the process the benefit of more-rational behavior than might otherwise be likely.

I, too, am a pragmatist. I grasp that the world has changed. Although we've retained two data centers (run by a fellow I'll call Ted), we have also embraced PCs by the truckload, client/server architectures and all of the other alternatives to glass-house IT federalism.

Not everyone is quite so enthusiastic. Ted, for instance. He recently called my attention to a pending decision on a plan proposed by one of his so-called customers: to leave the shelter of the data centers and go it alone with a box of its own. This defection plan coincided with a large capital request that my friends in finance asked me to examine.

Now, my tendency at Corporate is to pick my fights very carefully—especially in these days of autonomy and decentralization and "Who the heck needs a CIO, anyway?" The renegade business unit, one of the company's most geographically remote, had used all the right words in its proposal: Unix, open, client/server, parallel processing. And Ted *did* seem to have drawn the wagons in a circle, hoping to protect his organization, avert the threat of a full-blown stampede and, maybe, save his job. So, yeah, I was a bit suspicious of his motives. Still, I decided to look into the matter since I wasn't all that familiar with the remote unit.

My first worrisome discovery was that the would-be defectors—the Acme division—had chosen a box from a vendor in the throes of financial troubles. The vendor was offering a tantalizingly deep discount, which also looked like a possible red flag. And I was not reassured by the fact that the Securities and Exchange Commission was sniffing around the vendor. A new and unique box from a vendor with which we had no experience combined to pique my interest. And, of course, Acme declared it had looked at competitive alternatives and had concluded that only the box it specified could

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